BOTANICAL MISCELLANY;

CONTAINING

FIGURES AND DESCRIPTIONS

OF

SUCH PLANTS AS RECOMMEND THEMSELVES BY THEIR

NOVELTY, RARITY, OR HISTORY,

OR BY

THE USES TO WHICH THEY ARE APPLIED IN

THE ARTS,

IN MEDICINE, AND IN DOMESTIC ŒCONOMY;

TOGETHER WITH

OCCASIONAL BOTANICAL NOTICES AND INFORMATION.

BY

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VOL. I.

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MDCCCXXX.

TO THE

HONOURABLE THE COURT OF DIRECTORS

OF THE

EAST INDIA COMPANY,

AS A TESTIMONY OF THE IMPORTANT SERVICES RENDERED TO

SCIENCE

IN THEIR PRINCELY PATRONAGE OF

BOTANY,

BY WHICH THE PLANTS OF THE VAST POSSESSIONS UNDER THEIR SWAY,

ESPECIALLY THE MORE INTERESTING AND USEFUL KINDS,

HAVE BEEN MADE KNOWN AND MUNIFICENTLY DISTRIBUTED THROUGHOUT THE WHOLE CIVILIZED WORLD,

THE PRESENT WORK IS DEDICATED,

WITH SENTIMENTS OF THE HIGHEST ADMIRATION AND ESTEEM,

BY THEIR OBEDIENT AND VERY HUMBLE SERVANT,

W. J. HOOKER, LL. D.

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SPIRIDENS REINWARDTII.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN. CHAR. (Spiridens, *Nees.*) *Seta* lateralis. *Peristomium* duplex: *ext.* e dentibus 16, subulatis, spiraliter involutis: *int.* e ciliis 16, remotiusculis, subulatis, linea media notatis atque apicem versus perforatis. *Calyptra* dimidiata.

Spiridens *Reinwardtii.* (TAB. I.)
Spiridens Reinwardtii. *Nees von Esenbeck, in Nov. Act. Acad. vol.* 11. *p.* 144. *t.* 17. A.

HAB. In summo monte ignivomo *Tidor,* Moluccarum minorum insula. *Reinwardt.*

Caules subcæspitosi, basi densissime ferrugineo-tomentosi, pedales et ultra, erecti, ramosi; ramis subsimplicibus non raro subsecundis. *Folia* undique inserta, patentia, flavo-viridia, subsquarrosa, inferiora præcipue, ovato-lanceolata, longe angusteque acuminata, rigidiuscula, membranacea, substriata, basi amplexicaulia, margine incrassata, acute serrata. *Perichætialia: exteriora* erecta, ovato-acuminata, enervia; *superiora* longiora, convoluta, longe cuspidato-acuminata, vix serrulata. *Seta* lateralis, perbrevis, perichætio immersa. *Capsula* obliqua, ovato-oblonga, fusca, lævis. *Calyptra* conico-acuminata, hinc lateraliter fissa. *Operculum* conico-subulatum, capsula dimidio brevius. *Peristomii externi dentes* sedecim, longi, lineari-lanceolati, fulvi, transversim striati, madore erecti, siccitate basi reflexi, dein spiraliter involuti; *interni cilia* his paulo breviora, erecta, conniventia, libera, subulata, transversim striata, linea media longitudinali notata, atque versus apicem medio perforata, basi membrana reticulata, flava, exserta unita. *Columella* subcylindracea, apice dilatata, massam spongiosam, reticulatam, ovato-acuminatam sustinens. *Semina* minutissima, sphærica.

MY valued friend Dr. Nees von Esenbeck, has been so obliging as to send me fine specimens of this most noble of all Mosses, which he has ably illustrated both by figures and

descriptions in the work above quoted. That author suspects that the *Bartramia gigantea* of Schwaegrichen's *Suppl. v.* ii. *t.* 63. may belong to the same genus as the present; but as the fruit of that plant is unknown, this point cannot at present be determined.

The character of this genus, as its name implies, is dependent upon the spirally involute nature of the teeth of the peristome, as seen when dry; in this particular bearing much affinity with the *Tayloria splachnoides.* In other respects the essential characters are scarcely different from those of *Hypnum,* from which however it may be distinguished by its habit; and in that it is more nearly allied to the *Bartramiæ.*

Fig. 1. Plant (*nat. size*). *Fig.* 2. Leaf. *Fig.* 3. Perichætium and capsule, with its calyptra. *Fig.* 4. Operculum. *Fig.* 5. Peristome. *Fig.* 6. Teeth of the outer; and *Fig.* 7. Teeth of the inner peristome. *Fig.* 8. Portion of the columella with the spongy extremity which filled the operculum. *Fig.* 9. Seeds:—*more or less magnified.*

BRYUM GILLIESII.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN. CHAR. *Seta* terminalis. *Peristomium* duplex: *ext.* sedecim-dentatum; *int.* e membrana sedecim-laciniata, nunc ciliis interpositis. *Calyptra* dimidiata.

Bryum *Gilliesii;* cæspitosa ramosa, foliis ovatis concavis obtusis integerrimis grosse reticulatis, nervo integro, capsula inclinata una cum apophysi pyriformi, operculo brevi-conico. (TAB. II.)

HAB. In terram ad radices montium in Andibus, prope Mendozam. *D. Gillies.*

Caules sublaxe cæspitosi, inferne radiculosi, semiunciam longi, erecti, rubicundi, subramosi. *Rami* dichotomi, non raro ex innovationibus orti. *Folia* subarcte imbricata, erecta, fere exacte ovata, concava, valde obtusa, integerrima, succulenta, laxe reticulata, pallide viridia, nervo valido, usque ad apicem attingente, instructa. *Seta* terminalis, semipollicaris, lævis. *Capsula* inclinans una cum apophysi fere exacte pyriformis, primum viridis, demum luteo-fusca. *Calyptra* juvenis fere cylindracea, hinc lateraliter fissa. *Operculum* conicum, vel conico-hemisphæricum, obtusum. *Peristomium externum* e *dentibus* sedecim, acuminatis, breviusculis, aureo-fuscis; *internum* e membrana flava reticulata, sedecim-laciniata, laciniis remotis, erectis, angustis, strictis, ciliis interpositis nullis.

FROM a view of the capsule and leaves alone of this curious little Moss, there are few botanists but would pronounce it to belong to the genus *Splachnum:* but it is altogether a terrestrial plant, and appears to grow in a very dry and arid soil; and on carefully removing the operculum and the outer teeth of the peristome, the inner laciniated membrane comes to view, showing it to belong to the genus *Bryum,* or that division of it called *Pohlia* by many authors, wanting the interposed ciliæ to the inner peristome: and thus bearing the same re-

lation to *Bryum*, as *Leskea* does to *Hypnum*. This mode of structure too, both in *Pohlia* and *Leskea* is generally, but unfortunately not always, accompanied by an erect capsule. We are, however, now acquainted with many species which have interposed ciliæ, so minute and imperfect that it would be difficult to say to which division the species possessing them should belong.

In regard to the individual here figured, it is totally unlike any species of *Bryum* hitherto described; and I have much pleasure in dedicating it to my friend Dr. Gillies, its discoverer, whose botanical collections, made in a previously unexplored part of South America, are destined to afford some of the most interesting materials of the present publication.

Fig. 1. Plants (*nat. size*). *Fig.* 2. Single plant. *Fig.* 3. Leaf. *Fig.* 4. Calyptra. *Fig.* 5. Teeth of the outer peristome. *Fig.* 6. Portion of the inner peristome:—*more or less magnified.*

ASTELIA ALPINA.

HEXANDRIA MONOGYNIA. Nat. Ord. *Inter* ASPHODELEAS *et* JUNCEAS. *Br.*

GEN. CHAR. (Astelia. *Banks et Soland.*) *Flores* polygami-dioici. HERM. *Masc. Perianthium* sexpartitum, semiglumaceum. *Stamina* 6, imo perianthio inserta. *Pistillum* imperfectum. HERM. *Fœm. Perianthium* ut in masculo, persistens. *Stamina* imperfecta. *Ovarium* triloculare v. uniloculare, placentis tribus parietalibus: polyspermum. *Stylus* 0. *Stigmata* 3, obtusa. *Bacca* 1—3-locularis, polysperma.

Herbæ *habitu fere* Tillandsiæ, *et pariter supra arborum truncos vivos v. emortuos quandoque parasiticæ.* Radix *fibrosa.* Folia *radicalia trifariam imbricata, lanceolato-linearia v. ensiformia, carinata, villis appressis, compressis, utrinque subtusve instructa, basibus sericeo-lanatis.* Caulis *nullus v. brevis, paucifolius.* Flores *racemosi v. paniculati, raro subsolitarii, pedicellis inarticulatis, basi unibracteatis, parvi, extus sericei.—Br. in Fl. Nov. Holl.*

Astelia *alpina;* foliis strictis utrinque sericeis, racemo infra diviso, racemulis paucifloris, baccis ovalibus unilocularibus, perianthiis sexpartitis. *Br.* (TAB. III.)

Astelia alpina. *Br. in Prodr. Fl. Nov. Holl. v.* 1. *p.* 291. *Smith in Rees' Cycl. Spreng. Syst. Veget. v.* 2. *p.* 144.

HAB. Insula Van Dieman, *Brown,*—in summitatem montis Wellington, alt. 4000 ped. *Fraser.*

Radix fibrosa (Br.). *Caulis* perbrevis, fere nullus, e basibus vaginantibus fuscis foliorum formatus, atque pilis albis, longis, numerosissimis pulcherrime sericeis, densissime obsitus. *Folia* fere omnino radicalia, pedalia et ultra, semiunciam lata, linearia, acuminata, basi lata, vaginantia, costata, striata, inferne carinata, utrinque sed subtus præcipue, sericeo-villosa.

Scapus radicalis (?), in meis exemplaribus foliis brevior, densissime albo-sericeus, racemo compacto paniculato terminatus. *Pedunculi* bracteis foliaceis bi-quadri-pollicaribus suffulti. *Flores fœmineos* solummodo vidi. Hi bracteati, bractea lanceolata, sericea. *Perianthium* profunde sexpartitum, laciniis lanceolatis subinæqua-

libus, subglumaceis, fuscis, extus sericeis. *Stamina* minuta, abortiva, laciniis opposita. *Germen*, vel *Bacca*, vix matura, oblonga, glabra, stigmatibus tribus obtusis sessilibus terminata, unilocularis, trivalvis? *Receptacula* tria, filiformia, parietalia. *Stamina* immatura plurima, pedicellata.

The specimens from which I have been able to make the accompanying drawing and description of this plant, were communicated to me, along with very many other rare Australasian plants, from the summit of Mount Wellington in Van Dieman's Isle, where it grows at an elevation of 4000 feet above the level of the sea, forming densely matted patches. No figure can give an idea of its beauty, clothed as it is with white extremely dense silky hairs in almost every part, more especially on the sheathing bases of the leaves. The general aspect of the *Astelia* is not otherwise very dissimilar to our *Luzula maxima*, and Mr. Brown regards the genus as intermediate between the *Asphodeleæ* and *Junceæ*. At the same time that illustrious botanist observes that it approaches to the *Tillandsiæ*, and like them is sometimes parasitic upon the trunks of trees. Mr. Brown mentions at least one other species, as existing in New Zealand; and a third, Sir James E. Smith has described from the collection of Mr. Menzies, made in the Sandwich Islands, (*A. Menziesiana*, Sm.), which differs essentially from the present individual in having a trilocular berry, and may, on that account, prove to be distinct as to genus; but in habit the two plants are almost exactly the same; and as I am in possession of beautiful specimens, given to me by Mr. Menzies, I shall take the opportunity of figuring the *A. Menziesiana* in this work. The *Melanthium pumilum* of Forster is also considered to belong to the present genus.

Fig. 1. Perianth, with one segment cut away, and the germen removed from a female flower, to show the abortive stamens. *Fig.* 2. Germen. *Fig.* 3. Inner view of a portion of the same, to show the parietal receptacle and the ovules:—*magnified.*

MUTISIA ILICIFOLIA.

SYNGENESIA SUPERFLUA. Nat. Ord. COMPOSITÆ, *Div.* LABIATIFLORÆ, *DeC.* PERDICIEÆ, *Spreng.*

GEN. CHAR. *Involucrum* cylindricum imbricatum, squamosum; squamis latis. *Receptaculum* nudum. *Flosculi, disci* hermaphroditi, tubulosi, 5-dentati, demum in lacinias 2—5 æquales, vel in tres inæquales fissi; *Antheræ* bisetosæ; *radii* fœminei, bilabiati; labio inferiore ligulam referente, tridentato, superiore minore bipartito, (raro integro v. nullo); rudimenta filamentorum 5. *Pappus* plumosus.

Mutisia *ilicifolia*; glabra scandens, foliis amplexicaulibus cordato-ovalibus spinoso-dentatis reticulatis cirrhiferis, pedunculis unifloris. (TAB. IV.)

Mutisia ilicifolia. *Cav. Ic.* 5. *p.* 63. *t.* 493. *Willd. Sp. Pl. v.* 3. *p.* 2069. *Pers. Syn. Pl. v.* 2. *p.* 453. *Spreng. Syst. Veget. v.* 3. *p.* 505.

HAB. Prope villam Vicenziam, in Chili. *D. Cruickshanks.*

Caulis ramosus? scandens, angulatus, angulis subalatis nunc spinosis. *Folia* sesquipollicaria, remota, alterna, patentia, nunc reflexa, coriacea, ovalia, basi cordata, amplexicaulia, apice truncata, margine repande dentato-spinosa; reticulata, glabra, costa in cirrho longo simplici terminata. *Pedunculus* terminalis, solitarius, uniflorus. *Flos* magnus, speciosus. *Involucrum* cylindraceum; squamis imbricatis, late-ovatis, membranaceis, appendice lanceolata coriacea terminatis, infimis reflexis, supremis inappendiculatis, apice tomentosis. *Flosculi, radii* fœminei, duas uncias longi, sanguinei, inferne tubulosi, apice ligulati, subbilabiati, labio exteriore, seu ligula, apice tridentato, interiore minutissimo erecto bifido: ore rudimentis staminum quinque. *Germen* oblongum, glabrum, pappo longo plumoso basi unito terminatum. *Stylus* flosculo brevior. *Stigma* inæqualiter bifidum. *Flosculi, disci* hermaphroditi, bilabiati, *labio exteriore* ligulato, recurvato, tridentato, *interiore* bipartito, laciniis arcte revolutis. *Stamina* prope medium tubi inserta. *Antheræ* exsertæ, flavæ, basi biaristatæ. *Pistillum* ut in fœmineo: ad basin styli vagina cylindracea (fig. 3.)

AMONG the *Compositæ* there are few plants more remarkable for the beauty of their flowers, and their varied and singular

foliage, than the *Mutisiæ.* One species, the *M. speciosa,* has been cultivated at the Royal Gardens at Kew, and figured in the *Botanical Magazine,* at the first plate of the New Series of that work; but as it has pinnated leaves, somewhat similar to those of a *Vicia,* the plant assumes an appearance very unlike the present individual. For representations of other *Mutisiæ,* we are hitherto indebted almost wholly to Cavanilles and Humboldt.

I intend to make known, by this work, some interesting species which I have received from my valuable correspondents W. Cruickshanks, Esq. of Valparaiso, and Dr. Gillies of Mendoza; and I shall esteem myself happy thus to be the means of recommending them to the horticulturist, as no plants can be more worthy of a place in our stoves.

Fig. 1. Floret of the ray. *Fig.* 2. Floret of the disk. *Fig.* 3. Base of the style to show the sheath which surrounds it. *Fig.* 4. Base of an anther:—*more or less magnified.*

MUTISIA RUNCINATA.

Mutisia *runcinata;* foliis lanceolatis runcinatis decurrentibus cirrhosis, subtus albo-tomentosis. (TAB. V.)

Mutisia runcinata. *Willd. Sp. Pl. v.* 3. *p.* 2069. *Spreng. Syst. Veget. v.* 3. *p.* 505.

Mutisia retrorsa. *Cav. Ic.* 5. *p.* 65. *t.* 498. *Pers. Syn. Pl. v.* 2. *p.* 453.

HAB. Apud Quebradas, prope villam Vicenziam in Chili. *D. Gillies.*

Caulis frutescens, scandens, flexuosus, angulatus, foliis decurrentibus alatus. *Folia* alterna, rigidiuscula, lanceolata, runcinata, basi utrinque in alas decurrentia, supra glabra, subtus albo-tomentosa, apice cirrho simplici terminata. *Flores* ad apicem ramorum terminales. *Involucrum* ovato-cylindraceum, squamis infimis parvis, reflexis, reliquis magnis, erectis, ovatis, submembranaceis. "Corollæ radii lineares, tridentatæ." (*Willd.*)

The leaves of this species are deeply runcinate, and form a striking contrast in the dark colour of their upper surface with the white of the lower side. In the specimens which Dr. Gillies has been so kind as to send me of this plant, the florets of the circumference are wanting; they are probably similar to those of *M. ilicifolia*.

MUTISIA INFLEXA.

Mutisia *inflexa*; scandens, caule tereti angulato, foliis angusto-linearibus cirrhosis sessilibus, marginibus revolutis. (Tab. VI.)

Mutisia inflexa. *Cav. Ic. 5. p. 65. t. 496. Willd. Sp. Pl. v. 3. p. 2070. Pers. Syn. Pl. v. 2. p. 453. Spreng. Syst. Veget. v. 3. p. 505.*

Hab. Apud "Alto del Puente" in Chili. *D. Cruickshanks.*

Caulis scandens, glaber, nunc subarachnoideo-tomentosus, angulatus, flexuosus. *Folia* glabra, vel ad basin subtomentosa, duas ad quatuor uncias longa, directione varia, non raro deflexa, vel basi deflexa sursum curvata, omnia angusto-linearia, vel subfiliformia, sessilia, marginibus revolutis, apice in cirrho attenuata. *Flos* magnus, terminalis; squamis infimis involucri solummodo appendice acuminatis reflexis, reliquis obtusis erectis imbricatis. *Flores radii* flavi.

Cavanilles describes the leaves of this species as deflexed at the base, which indeed is the case with some of my specimens from Mr. Cruickshanks; but then it appears to be owing to the pendent direction of the branches, whence the leaves take a curvature upwards to meet the light, for other branches have not this peculiar disposition of their foliage. Again, Willdenow describes the margins of the leaf as involute, "ac si inversa essent:" but they are certainly revolute, if my species be the same as Willdenow's and Cavanilles's.

MUTISIA SUBSPINOSA.

Mutisia *subspinosa*; scandens, caule alato, foliis lineari-lanceolatis dentato-spinosis basi decurrentibus apice cirrhosis. (Tab. VII.)

Mutisia subspinosa. *Cav. Ic.* 3. *p.* 64. *t.* 495. *Willd. Sp. Pl. v.* 3. *p.* 2070. *Pers. Syn. Pl. v.* 2. *p.* 453. *Spreng. Syst. Veget. v.* 3. *p.* 505.

Mutisia sinuata.* *Cav. Ic.* 5. *p.* 66. *t.* 499. *Spreng. Syst. Veget. v.* 3. *p.* 505.

Hab. Prope villam Vicenziam in Chili. *D. Gillies et Cruickshanks.*

Caulis tripedalis, scandens, flexuosus, angulatus, utrinque late alatus; alis sinuato-spinosis. *Folia* subcoriacea, pallide viridia, glabra, lineari-lanceolata, basi latiora, utrinque longe decurrentia, apice sensim in cirrho simplici attenuata, margine subsinuato-dentata, dentibus spinulosis, nunc omnino integerrima, et, non raro, vix decurrentia. *Flores* magni, speciosi, terminales, solitarii. *Involucrum* fere bipollicare, squamis imbricatis, inferioribus appendiculatis, infimis appendicibus reflexis. *Flosculi radii* pulcherrimi, aurei, apice tridentati.

This is perhaps the most beautiful of the simple-leaved *Mutisiæ*. It is hardly possible to conceive a more desirable plant for our hothouses; and it is doubly recommended by the singularity of its foliage. Unquestionably the species, judging from the specimens that have been sent me by Dr. Gillies and Mr. Cruickshanks, is liable to vary in the more or less deeply toothed or even entire margins of the leaves, and in the presence, absence, or breadth of the wings of the stem. Hence I am inclined to think that the *M. sinuata* of Cavanilles is scarcely distinct from this species.

Dr. Gillies observes, that this and all the family of *Mutisiæ* are known in the language of the country by the name of *Estrella*.

MUTISIA LINEARIFOLIA.

Mutisia *linearifolia;* scandens (?) caule tereti, foliis linearibus apice acutis rigidis subspinosis rectis vel uncinatis, marginibus revolutis. (Tab. VIII.)

Mutisia linearifolia. *Cav. Ic.* 5. *p.* 66. *t.* 500. *Willd. Sp. Pl. v.* 3. *p.* 2071. *Pers. Syn. Pl. v.* 2. *p.* 453. *Spreng. Syst. Veget. v.* 3. *p.* 505.

Hab. Apud "Alto de la Laguna" et "Los Ojos de Agua," in descensu Cordilleræ versus regnum Chilense. Fl. Martio. *D. Gillies.*

Caulis flexuosus, scandens? fruticosus, ut et tota planta, glaberrimus, vix angulatus, pallide fuscus. *Folia* conferta, undique inserta, non raro subsecunda, sesquiunciam longa, pallide viridia, linearia, sessilia, margine revoluta, apice acutissima, subspinosa, recta, sæpe uncinata, sed non omnino cirrhosa. *Flos* magnus pulcherrimus. *Involucri squamæ* infimæ acuminatæ, reflexæ, reliquæ obtusæ. *Flosculi disci*, ut videtur, lutei, longi, apice tridentati, labio interiore distincto bipartito. *Pappus* albus.

It is evident that in this and probably in all the other species, the florets of the disk are at first tubular, bursting at the extremity into five teeth. Generally, two of these teeth, separating still lower down, become revolute, while the portion having the three terminal teeth is bent back; hence the bilabiate corolla is formed, such as is represented at Tab. IV. *f.* 2.

It must be allowed that this species (which I think is the same as the *M. linearifolia* of Cavanilles, notwithstanding the disposition of the foliage to become cirrhose) approaches very nearly to the *M. inflexa* Tab. VI. Here, however, the leaves are shorter and broader, and never terminated by an actual tendril. The stems, too, are more robust; less, if at all, scandent; the leaves more crowded; and the flowers larger.

MUTISIA LINIFOLIA.

Mutisia *linifolia;* caule fruticoso erectiusculo, foliis confertis anguste lineari-lanceolatis planis. (Tab. IX.)

Hab. El Camino de las Minas de Uspallata. Fl. Martio. *D. Gillies.*

Frutex, ut videtur, parva, basi decumbens, dein erecta, ramosa, ramis erectis. *Folia* undique inserta, conferta, ubique glaberrima, erecta, vel erecto-patentia, semiunciam fere ad duas uncias longa. *Flores* oblongi, fere sessiles et foliis subimmersi. *Involucrum* fusco-castaneum, cylindraceum, squamis omnibus scariosis oblongis erectis, imbricatis, appressis. *Flosculi radii* desunt in meis exemplaribus, *disci* involucro paulo longiores, erecti, bilabiati, siccitate flavi.

This singular species of *Mutisia* was gathered by Dr. Gillies, near the celebrated mines of Uspallata in South America, and proves quite different from any hitherto described. It forms a small shrub, with numerous branches, and leaves not unlike those of *Linum maritimum;* or if the flowers be taken in conjunction with the leaves, it bears a striking resemblance to some of the smaller Cape *Proteaceæ.* The margins of the foliage are not in the slightest degree revolute, nor is there the least appearance of a tendril, or even of a hardened point at the extremity of the leaves.

JUNGERMANNIA SERRULATA β.

CRYPTOGAMIA HEPATICÆ. Nat. Ord. HEPATICÆ.

GEN. CHAR. *Receptaculum* commune nullum. *Calyx* monophyllus, tubulosus, (raro nullus). *Capsula* 4-valvis, seta calyce longiore.

Jungermannia *serrulata;* caule erectiusculo ramoso, foliis distichis patentibus emarginato-bifidis conduplicatis marginibus imbricatis spinuloso-dentatis, stipulis his similibus sed minoribus planiusculis, calyce terminali oblongo subplicato acuminato, ore dentato. (TAB. X.)

Jungermannia serrulata. *Hook. Brit. Jung. t.* 88.

β. purpurea.

HAB. β. In Brasilia, prope Rio Janeiro. *D. Burchell.*

Caules laxe cæspitosi, suberecti dichotome ramosi, non raro proliferi, duas vel tres uncias longi. *Folia* pulcherrime purpurea, vix lineam longa, patentia, suborbiculata, longitudinaliter conduplicata, lateribus incurvis imbricatis remote dentato-spinulosis, apice emarginato-bifida, minute reticulata, areolis oblongis. *Stipulæ* rotundatæ, planiusculæ apice bifidæ, marginibus spinuloso-dentatis. *Calyx* terminalis, foliis perichætialibus laciniatis basi cinctus, sesquilineam longus, oblongus, purpureus, subplicatus, versus apicem præcipue, ore breviter laciniato. *Fructum* non vidi, sed intra calycem, germen oblongum parvum stylo terminatum, pistilla abortiva tria vel quatuor gerens.

AMONG several very interesting plants obligingly communicated to me by Mr. Burchell from Rio Janeiro, is the present beautiful variety of a species, which has already been found in Jamaica and in the Isle of France. It appears therefore to have a widely extended geographical range.

Fig. 1. Plants (*nat. size*). *Fig.* 2. Portion with the calyx, and seen from the anterior side. *Fig.* 3. Portion of the stem and leaves, seen from the posterior side. *Fig.* 4. Single leaf. *Fig.* 5. Stipule. *Fig.* 6. Portion of a leaf. *Fig.* 7. Pistil bearing other abortive pistils :—*magnified.*

USNEA FASCIATA.

Cryptogamia Lichenes. Nat. Ord. Lichenes.

Gen. Char. *Apothecia* orbiculata, terminalia, peltata, a thallo formata ejusque substantia corticali similari undique obtecta, ambitu immarginato, plerumque ciliato. *Thallus* subcrustaceus teretiusculus ramosus substantia elastica filiformi hyalina centrali percussus.—*Ach.*

Usnea *fasciata;* ramosissima tuberculato-scabra flavo-virescens, ramis repetitim dichotomis proliferis sæpissime nigro-fasciatis ultimis lateralibusque numerosissimis capillaceo-attenuatis, apotheciis hemisphæricis nudis brunneis extus tuberculatis. (Tab. XI.)

Usnea fasciata. *Torrey in Silliman's American Journ. of Sc. v.* 6. *cum ic.* (*absq. apotheciis.*)

Hab. In rupibus antarcticis Novæ Zetlandiæ meridionalis.—In Nova Hollandia, locis alpinis?

Thallus cæspitosus, erectus, 3—4-uncialis, erectus, ramosissimus, flavo-virescens, ramis repetitim dichotomis magis minusve tuberculoso-scabridis atque proliferis, ramulis minutis gracilibus simplicibus filiformi-attenuatis vel ramosis subhorizontalibus, e latere egredientibus, ramis ultimis sæpe nigro-fasciatis attenuatis. *Apothecia* terminalia peltata, primum parva, globosa, demum hemisphærica, semiunciam diametro, intus fusca, extus e thallo formata, minute tuberculata.

W. Edwards, Esq., who accompanied in a medical capacity the first and second expeditions sent to discover a north-west passage, was so obliging as to procure the fine specimen here represented of the antarctic *Usnea,* on which some observations will be offered under the following species.

Fig. 1. Plant (*nat. size*). *Fig.* 2. Portion:—*magnified.*

USNEA SPHACELATA.

Usnea *sphacelata*; thallo erectiusculo fruticuliformi, ramis primariis ochroleucis nigro-vittatis lævibus, ultimis attenuatis nigris, sorediis confertis concoloribus ochroleucisve. *Br.* (Tab. XII.)

Usnea sphacelata. *Br. in Parry's First Voy. App. p.* cccvii. *Hooker Acc. of Arct. Pl. in Linn. Trans. v.* 14. *p.* 384.

Usnea? prope melaxantham. *Br. Spitzb. Pl. in Scoresby's Arct.* 1. *App. p.* 76.

Hab. In rupibus apud Spitzbergen. *D. Scoresby et Sabine.* In Insula Melville. *D. Parry.* In summitate Montis Tabularis Insula Van Dieman. *D. Brown.*

"Proxima *U. melaxanthæ* Ach. Syn. *p.* 303, differt statura aliquoties minore, ramis primariis lævibus, serediorum præsentia. Apothecia nondum visa. Eandem speciem, sorediis pariter instructam apotheciisque destitutam, in summitate Montis Tabularis Insulæ Van Dieman, anno 1804, legi." *Br.*

Mr. Brown has here justly observed how closely this species is allied to the South American *U. melaxantha.* Indeed, that lichen which I have described as the *U. melaxantha* in Humboldt and Kunth's *Synopsis,* and which is found at an elevation of more than 10,000 feet upon the Andes, differs in no respect from the present plant, except in having the base of the thallus of a reddish yellow, and the extremities of the branches more black. Mr. Brown further mentions that he has found *U. sphacelata* also, but destitute of fructification, upon Table Mountain, in Van Dieman's Island. From a neighbouring country, New Holland, I have received the equally nearly allied species, *U. fasciata,* and in a very fine state of fructification, differing in no respect from the antarctic specimens. These latter approach the *U. sphacelata* in their pale yellowish hue, the *U. melaxantha* in the more crowded ramification, and hispid or tuberculated thallus; and differ

from both in the less blackened extremities. Future observations may induce us to unite the two species now described, together with *U. melaxantha*, thus giving a further proof of the extensive range of country occupied by the same species among the lower orders of the vegetable creation.

Fig. 1. 1. Plants (*nat. size*). *Fig.* 2. Stem and branches; and *Fig.* 3. Portion of a stem with a soredium:—*magnified.*

STICTA MACROPHYLLA.

CRYPTOGAMIA LICHENES. Nat. Ord. LICHENES.

GEN. CHAR. *Apothecia* scutelliformia, subtus e thallo formata, centro affixa. *Discus* coloratus, planus. *Thallus* foliaceus, coriaceo-cartilagineus, expansus, lobatus, subtus liberus villosus vel tomentosus, cyphellis sorediis vel maculis interspersis.

Sticta *macrophylla;* effusa, thallo subcartilagineo crassiusculo lurido-virescente siccitate cinerascente glabro repetitim dichotomo segmentis latis undulatis obtusissimis, subtus fusco-tomentoso, cyphellis albis limbatis, apotheciis fuscis extus tomentosis.

α. apotheciis sparsis.

Sticta macrophylla (Delis). *Feé Crypt. des Ecorces, p.* 129. *t.* 33.* *Spreng. Syst. Veget. v.* 4. *p.* 303.

β. apotheciis marginalibus. (TAB. XIII.)

HAB. Arboribus Insulæ Mauritii. *D. Bojer.* Insula Franciæ; et in variis regionibus Americæ Meridionalis, supra ramos annosos Cinchonarum peruvianarum. *Fée.*

Thallus late effusus, diametro spithamæus et ultra, suborbiculari-expansus, laciniato-lobatus, imbricatus, laciniis liberis repetitim dichotome divisis, segmentis latis, subundulatis, obtusissimis; supra omnino glaber, lævis, absque sorediis, madore lurido- vel subfusco-viridis, siccitate pallide griseus vel cinerascens, ad marginem fuscescens: subtus ubique fusco-tomentosus, ad marginem pallidior. *Cyphellæ* numerosæ, urceolatæ, albæ, limbatæ vel marginatæ. *Substantia* subcartilaginea, siccitate rigida, madefacta magis flaccida. *Odor* fere ut in *Sticta fuliginosa* Europæ. *Apothecia* primum globosa, demum explanata, compressa, fusca, disco plano, subtus margineque tenui tomentosa, in α sparsa, in β omnino marginalia.

I WAS prepared to publish this noble species of *Sticta*, which I had received from the Mauritius more than two years

* It is called *M. macrocarpa* in the text; but that name is not applicable to the plant, nor is it followed in the index, or on the plate. Sprengel, too, calls it *macrocarpa*.

ago, with the name of its indefatigable discoverer in that island, M. Bojer, when I obtained from Paris the last number of Fée's *Essai sur les Cryptogames des Ecorces Officinales*, where it appears under the appellation here adopted. The figure there given is what I call the *var. α.* with scattered apothecia. Both kinds were found by M. Bojer in the Mauritius.

STICTA HUMBOLDTII.

Sticta *Humboldtii*; thallo subumbilicato cinereo-fuscescente utrinque dense tomentoso, cyphellis majusculis concoloribus, margine varie lobato, lobis rotundatis, apotheciis sparsis sessilibus nigro-fuscis extus tomentosis. (Tab. XIV.)

Sticta Humboldtii. *Hooker in Humb. et Kunth, Syn. Pl. Æq. v.* 1. *p.* 28. *Humb. Nov. Gen. et Sp. Pl. v.* 7. *p.* 86.

Hab. Ad corticem *Befariæ*, *Thibaudiæ*, et *Escalloniæ*, in frigidis Paramo de Almaguer, alt. 1430 hexapod. (Regno Novo-Granatensi). *Humboldt.*

Thallus effusus, diametro 3—4-uncialis, suborbicularis, umbilicatus, centro affixus, in lobos rotundatos, subimbricatos profunde divisus, lobis iterum breviter irregulariterque lobatis, subundulatis; cinereo-fuscescens, utrinque dense molliterque tomentoso-hirsutus, subtus pallidior. *Cyphellæ* concolores, paululum convexæ. *Apothecia* sparsa, numerosa, primum hemisphærica, demum plana, intense fusca, sessilia, subtus margineque involuto pallido dense tomentosa.

The same peculiar smell exists in this, as in some other species of this genus, among which this may well rank as the most beautiful.

Fig. 1. Plant (*nat. size*). *Fig.* 2. Side view of an apothecium. *Fig.* 3. Vertical section of an apothecium. *Fig.* 4. Apothecium seen from above:—*magnified.*

ADENOCAULON BICOLOR.

Syngenesia Necessaria. Nat. Ord. Compositæ.

Gen. Char. (Adenocaulon, *Hook.*) *Involucrum* pentaphyllum, patens, demum reflexum. *Flosculi* subdecem, tubulosi, disci masculi, radii fœminei. *Achenia* oblongo-clavata, superne glanduloso-hispida. *Pappus* nullus. *Receptaculum* nudum.

Adenocaulon *bicolor.* (Tab. XV.)

Hab. Sylvis densis apud Fretum de Fuca, atque prope Fort Vancouver ad flumen Columbiæ, in ora occidentali Americæ Septentrionalis. *D. Scouler.* In montibus "Rocky Mountains" dictis. *D. Drummond.*

Caulis herbaceus, erectus, 3—4-pedalem altus, repetitim dichotome ramosus, teres, inferne albo-tomentosus, superne glandulosus, glandulis nigris viscosis, pedicello diaphano, longiusculo suffultis. *Folia* ovato-cordata; inferiora multo majora, magisque cordata, superiora sensim minora magisque ovata; omnia subtriloba atque angulato-dentata, submembranacea, tenera, superne viridia, glaberrima, subtus dense niveo-tomentosa, basi in petiolum longum tomentosum decurrentia. *Paniculæ* numerosæ, terminales, foliosæ, tomento omnino destitutæ, glandulis pedicellatis tectæ. *Flores* pedicellati, bracteati, pro magnitudine plantæ, parvi. *Involucrum* e foliolis 5 patentibus, ovatis, concavis, subtus margineque glandulosis, demum reflexis. *Flosculi* circiter decem, omnes tubulosi parvi, centrales 5, masculi; marginales 5, fœminei, omnes 5- nunc rarius 4-fidi, laciniis reflexis. *Masc. Stamina* 5, exserta, flava. *Stylus* staminibus paulo longior: *Stigma* integrum: *Germen* oblongum, gracile, nudum, abortivum; *Fœm. Stamina* nulla vel 5, abortiva, vix cohærentia, polline destituta. *Stylus* exsertus: *Stigma* crassum, bifidum: *Germen* oblongum, basi subattenuatum, superne glandulosum. *Achenia* germine flosculorum triplo quadruplo majora, valde conspicua, cylindraceo-clavata, teretia, apice glandulis numerosis, nigris, pedicellatis instructa. *Pappus* omnino nullus. *Semen* pericarpio conforme. *Embryo* erectus, subcylindraceus. *Receptaculum* parvum, nudum, subconvexum, pro receptione flosculorum punctatum.

That so remarkable a plant as the present should have escaped the notice of Mr. Menzies and other botanists who had visited the north-west coast of America, I can hardly conceive possible. At the same time, as I am wholly unable to find any description of it, or of a genus that at all corresponds with it, I am under the necessity of introducing it as a plant altogether *sui generis*. The inflorescence at first sight bears a great similarity to that of some umbelliferous plants. The involucre is not very unlike the involucre of the old genus *Chærophyllum*, and it is so patent and includes so small a quantity of florets, that it has by no means the habit of the flower of the *Compositæ*. The foliage resembles that of a *Cineraria* or *Cacalia*, or, if the leaves be taken separately, of a *Tussilago*.

Dr. Scouler of Glasgow, in his late voyage to the north-west coast of America, (of which he has given an interesting account in the latter volumes of Dr. Brewster's Edinburgh Journal of Science,) had the good fortune to find this plant in considerable abundance, both at Fort Vancouver on the Columbia, and at the Straits of Juan de Fuca, considerably to the north of the Columbia, always growing in thick woods.

I have named this genus from the glands, which are abundant upon the stalks as well as on the fruit of the plant.

Fig. 1. Flower. *Fig.* 2. The same, more advanced. *Fig.* 3. 3. Female flowers. *Fig.* 4. Male flower. *Fig.* 5. Fully formed fruit. *Fig.* 6. Section of the same:—*magnified.*

SWIETENIA MAHAGONI.

(*Mahogany Tree.*)

DECANDRIA MONOGYNIA. Nat. Ord. MELIACEÆ.

GEN. CHAR. *Cal.* minimus, 4-fidus, deciduus. *Petala* 4—5. *Stam.* 8—10, filam. coalita in tubum apice dentatum, intus antheriferum. *Stylus* 1. *Stigma* capitatum. *Capsula* oviformis, lignosa, 5-locularis, polysperma, valvis a basi dehiscentibus, margine appositis ad angulos placentæ centralis pentagonæ. *Semina* deorsum imbricata, in alam expansa. *Albumen* carnosum. *Embryo* rectus. *Cotyledones* planæ, foliaceæ.—Arbores, *foliis alternis abrupte pinnatis paucijugis.* DeC.

Swietenia *Mahagoni*; foliis sub-4-jugis, foliolis ovato-lanceolatis inæqualibus apice acuminatis, racemis axillaribus paniculatis. *DeC.* (TAB. XVI. XVII.)

Swietenia Mahagoni. *Jacq. Amer. p.* 127. *Linn. Sp. Pl. p.* 548. *Willd. Sp. Pl. v.* 2. *p.* 557. *Pers. Syn. Pl. v.* 1. *p.* 469. *Smith in Rees' Cycl. Decand. Prodr. v.* 1. *p.* 625. *Humb. et Kunth, Syn. Pl. Æq. v.* 3. *p.* 219.

Cedrus Mahogoni. *Mill. Dict.*

Cedrela foliis pinnatis &c. *Browne, Jam. p.* 158.

Arbor foliis pinnatis, nullo impari alam claudente &c. *Catesb. Carol. v.* 2. *p.* 81. *t.* 81.

HAB. In India Occidentali locis petrosis; Jamaica, Cuba, et aliis insulis Antillarum; apud Honduras, præcipue abundat. Prope Acapulco Mexicanorum, portum Oceani Pacifici. *Humboldt.*

Arbor maxima, trunco vasto, ramis tuberculatis, cinerascenti-fuscis. *Folia* alterna, pari-pinnata, 3—5-juga, foliolis oppositis remotis ovato-lanceolatis, obliquis, subcoriaceis, nervosis, glabris, subtus venosis, integerrimis, apice subacuminatis, basi in petiolum brevem attenuatis. *Panicula* axillaris 3—4 uncias longa, pendens, valde ramosa, glabra, ramis basi minute bracteatis, dichotomis. *Flores* parvi, flavo-virides. *Calyx* minutus, 5-lobus, lobis rotundatis, sub lente erosis. *Corolla* pentapetala, petalis oblongo-ovatis, concavis. *Tubus staminifer* cylindricus, petalis brevior,

apice decemdentatus, intus paulo infra apicem, antheriferus, antheris parvis ovato-rotundatis, sessilibus, flavis, dentibus tubi alternantibus. *Nectarium* basin germinis cingens, breve, apice denticulatum coccineum. *Pistillum* longitudine tubi staminiferi: *Germen* ovatum, viride: *Stylus* cylindraceus: *Stigma* peltatum. *Capsula* ovata, magnitudine ovi *Gallo-Pavonis*, lignosa, rufo-fusca, minute tuberculata, 5-locularis (*DeC.*) in valvis 5, e basi ad apicem dehiscens, intus lamina coriacea vestita. *Receptaculum* centrale, magnum, pentagonum, angulis marginibus valvarum oppositis, sed vix ad margines attingentibus, et sic capsula, sub-unilocularis. *Semina* rotundata, compressa, fusca, in alam longam sensim attenuata, pendentia, in 5 seriebus duplicibus collecta, intra angulos receptaculi inserta, et prope ejus apicem affixa (a. *t.* 17. *f.* 4.). *Albumen* album, tenue. *Cotyledones* foliaceæ, planæ. *Radicula* parva.

Few plants are more extensively valuable in a commercial point of view than the *Mahogany*, and few perhaps are less generally known in their history and botanical characters. The tree exists in but few stoves of our own country, and in such situations is never likely to bear flowers and fruit; and I cannot mention a single work, accessible to the generality of botanical students, where a good representation of it may be found. I hope to be here able, in some measure, to supply this deficiency, for I have been favoured with a beautiful series of drawings of the *Mahogany*, made in the Island of St. Vincent, by the Rev. Lansdown Guilding, from which, aided by well dried specimens from the same friend, and by some fine fruits sent to me by my late pupil, George Tyrrell, Esq. from Jamaica, the accompanying figures have been made.

The *uses* of *mahogany* wood are too well known to render it necessary for me to mention them in this place; further than to say that almost all our valuable furniture is formed of it, and that it is peculiarly adapted to such purposes in consequence of its great beauty, hardness, and durability, by means of which it may be carved into splendid ornaments,

and will take the most exquisite polish. It is said, too, to be almost indestructible by worms or in water, and to be bullet proof;—hence the Spaniards used to make their vessels of mahogany: and Captain Franklin took with him to the shores of the Arctic Sea, boats constructed in England of that wood, as being the lightest (in consequence of the thinness of the planks), and the most portable, combined with great strength. Although the Spaniards were, in all probability, the first to bring this wood into use, and although the French must be allowed to produce the most highly finished and ornamental work from it, it is into England that by far the largest importations of it are made, and where it is most extensively employed. Jamaica formerly yielded the greatest quantity of this wood, and the old Jamaica mahogany is still reckoned, I believe, more valuable than that afforded by other countries. The quality depends much on the situation where the tree grows. In an elevated stony spot, where one would imagine there was scarcely soil to give nourishment to the roots, the wood is found to be of a superior grain and texture; whereas in low and alluvial situations, however vigorous and luxuriant the plant may be, the quality of the timber is always inferior, more light and porous, and of a paler colour. I have no means of determining the quantity of mahogany which has recently been exported from Jamaica; but in 1753, according to Dr. Patrick Browne, there were sent out of the island, in planks, 521,300 feet. It is a little remarkable, that in Sloane's *History of Jamaica* no mention is made of the *Mahogany Tree.* Browne, in 1789, says that it is a wood universally esteemed, and which sells at a great price; but he "regrets that it is not cultivated in the more convenient waste lands of Jamaica, as it answers for all beams, joists, planks, boards and shingles, and has frequently been put to those uses in that island in former times."

Now, I believe, a very large portion of the mahogany

imported into Great Britain is derived from the Honduras, where it is unquestionably produced in most abundance, and where it constitutes so important an article of trade that I could not but feel anxious to procure information from the West India merchants of this country respecting the mode of its being cut, and its transportation. It is to James Ewing, Esq. LL.D. of Glasgow,—a gentleman who unites to the most extensive commercial engagements such a love of literature and the arts as is rarely combined in the same individual,—that I owe the following interesting history of the mahogany trade; which I think my readers will thank me for making generally known, and which Mr. Ewing had extracted in a measure from the Honduras Almanack for 1827.

The first discovery of the beauty of mahogany wood is attributed to the carpenter on board Sir Walter Raleigh's ship, at the time that vessel lay in some harbour in the Island of Trinidad, in 1595. Dr. Gibbons brought it into notice in England. He was an eminent physician about the end of the 17th or beginning of the 18th century; and a box for holding candles, and then a bureau, made of a block of mahogany, were given to him by his brother, a West Indian captain.

At Honduras, a period of two hundred years is considered to be necessary from the time of the plant springing from seed to that of its perfection and fitness for cutting; an operation which commences about the month of August. The gangs of labourers employed in this work consist of from twenty to fifty each; but few exceed the latter number. They are composed of slaves and free persons, without any comparative distinction of rank; and it very frequently occurs that the conductor of such work, here styled the captain, is a slave. Each gang has also one person belonging to it, termed the Huntsman, who is generally selected from the most intelligent of his fellows; and his chief occupation is to search the woods, or, as it is called in this country, *the bush*, to find em-

ployment for the whole. Accordingly, about the beginning of August, the huntsman is dispatched on his important mission, and if the owner be employed on his own ground, this is seldom a work of much labour or difficulty. He cuts his way into the most elevated situation among the thickest woods, where he climbs the tallest tree he can find, and thence minutely surveys the surrounding country. At this season the leaves of the mahogany tree are invariably of a yellow-reddish hue; and an eye accustomed to this kind of exercise can, at a great distance, discern the places where the wood is most abundant. To such a spot are his steps directed; and without compass or other guide than what his recollection affords, he never fails to reach the exact point at which he aims. On some occasions no ordinary stratagem is necessary to be resorted to by the huntsman, to prevent others from availing themselves of the advantage of his discoveries; for if his steps be traced by those who may be engaged in the same pursuit, which is a very common occurrence, all his ingenuity must be exerted to beguile them from the true scent. In this, however, he is not always successful, being followed by those who are entirely aware of the arts he may use, and whose eyes are so quick, that the lightest turn of a leaf or the faintest impression of a foot is unerringly perceived; even the dried leaves which may be strewed upon the ground, often help to conduct to the secret spot; and it consequently happens that persons so engaged must frequently undergo the disappointment of finding an advantage they had promised to themselves, seized on by others. The hidden treasure being, however, detected, the next operation is the felling of a sufficient number of trees to employ the gang during the season. The mahogany tree is commonly cut about ten or twelve feet from the ground, a stage being erected for the axeman employed in levelling it: this, to an observer, would appear a labour of much danger;

but it is very rarely that an accident happens to the people engaged in it. The trunk of the tree, from the dimensions of the wood it furnishes, is deemed the most valuable; but for purposes of an ornamental kind, the limbs or branches are generally preferred, the grain of them being much closer, and the veins more rich and variegated.

A sufficient number of trees being now felled to occupy the gang during the season, they commence cutting the roads, which may fairly be estimated as two-thirds of the labour and expense. Each mahogany work forms in itself a small village on the bank of a river; the choice of situation being always regulated by the proximity of such river to the mahogany intended as the object of future research.

In the arranging and appearance of the habitations much rural taste is often displayed; and it is highly gratifying to the curious to remark the different modes peculiar to the several nations or tribes of Africa, as also the improvement introduced by European experience in the construction of the dwellings,—among which the proprietor's residence, with storehouses, cattle-sheds, &c. invariably form a conspicuous figure; those of the different labourers being usually of a more humble appearance, but all built of the same material, which the surrounding countries afford in abundance. We have frequently seen houses of this kind completed in a single day, and with no other implement than the axe, consequently every workman is capable of performing the labour required to build his own dwelling. After completing this establishment, a main road is opened for it, in as near a direction as possible to the centre of the body of trees so felled, into which branch or wing roads are often introduced, the ground through which the roads are to run being yet a mass of dense forest, both of high trees and underwood. They commence by clearing away those of the latter description with cutlasses, which, although in appearance a

slender instrument, yet, from the dexterity with which it is used, answers the purpose admirably. This labour is usually performed by taskwork, of one hundred yards each man per day, which expert workmen will complete in six hours. The underwood being now removed, the larger trees are then felled by the axe, as even with the ground as possible, the task being also at this work one hundred yards per day to each labourer; although this is more difficult, from the number of hard woods growing here, which on failure of the axe are removed by the application of fire.

The trunks of these trees, although many of them are valuable for different purposes, such as Bullet-tree, Ironwood, Redwood, Sapodilla, &c. are thrown away as useless, unless they happen to be adjacent to some creek or small river which may intersect the road; in that case they are applied to the constructing of bridges across the same; which are frequently of considerable size, and require great labour to make them of sufficient strength to bear such immense loads as are brought over them. The quantity and distance of road to be cut each season depends on the situation of the body of mahogany trees, which, if much dispersed or scattered, will increase the labour and extent of road-cutting; and it not unfrequently happens that miles of road and many bridges are made to a single tree, and which tree may ultimately yield but one log. The roads being cleared of all the brushwood, still require the labour of hoes, pickaxes and sledge-hammers, to level the hillocks and to break the rocks, also such of the remaining stumps as might impede the wheels that are hereafter to pass over them.

The roads being now all ready, which may generally be effected in the month of December, the cross-cutting, as it is technically called, commences. This is merely dividing crosswise, by means of the saw, each mahogany tree into logs, according to its length: and it often occurs, that while

some are but long enough for one log; others, on the contrary, will admit of four or five being cut from the same trunk or stem,—the chief guide for dividing the trees into logs being to equalize the loads which the cattle are to draw, and prevent their being overburthened: consequently, as the tree increases in thickness, so the logs are reduced in length: this, however, does not altogether obviate the irregularity of the loads, and a supply of oxen are constantly kept in readiness to add to the usual number, according to the weight of the log: this becomes unavoidable, owing to the very great difference of size of the mahogany trees: the logs taken from one tree being about three hundred feet, while those from the next may be as many thousand; but the largest log ever cut in Honduras was of the following dimensions: Length 17 feet, breadth 57 inches, depth 64 inches; measuring 5168 superficial feet, or 15 tons weight*.

The sawing being now completed, the logs are separated one from the other, and placed in whatever position will admit of the largest square being formed, according to the shape which the end of each log presents, and is then reduced, by means of the axe, into a square form, although some of the smaller logs are brought into the round; yet with the larger description, it is essential to render them square, not only because the weight is thereby lessened, but because it prevents their rolling on the truck or carriage.

We now reach the month of March, when all the prepa-

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* The Glasgow Chronicle for Nov. 1827, contains the following particulars of the largest log of mahogany ever brought from Honduras to the port of that city.

"It was taken to the wood-yard on a four-wheeled carriage, and there placed between two other logs, preparatory to being cut up, as no saw-pit was capable of containing it. The length was 16 feet, depth 5 feet 6 inches, and the breadth 4 feet 9 inches. It contained 418 cubic feet, 5016 feet of inch deal; and the cost of sawing it, at 3*d*. a foot, amounted to 62*l*. 14*s*. The value of the whole, estimated at 1*s*. 2*d*. per foot, was 292*l*. 12*s*., and its weight was $7\frac{3}{4}$ tons, or at the rate of a cubic foot of $41\frac{1}{2}$ lbs."

ration before described is, or ought to be, completed, and the dry season, or time of drawing down the logs from the place of their growth commences. This process can only be carried on in the months of April or May; the ground during all the rest of the year being too soft to admit of a heavily laden truck to pass over it without sinking; and although the rains usually terminate about February, yet from the ground being so soaked with rain, the roads are seldom firm enough for use till the first of April. The mahogany cutter's harvest may be at this time said to commence, as the result of his season's work depends upon a continuance of the dry weather: for a single shower of rain would materially injure his roads. It is therefore necessary that not a moment should be lost in drawing out the wood to the river.

The number of trucks worked, is apportioned to the strength of the gang, and the distance generally from six to ten miles. We will, for example, take a gang of forty men, capable of working six trucks, each of which requires seven pair of oxen and two drivers; sixteen to cut food for the cattle, and twelve to load or put the logs on the carriages; the latter usually take up a temporary residence somewhere near the main body of the wood, it being too far to go and return each day to the river side or chief establishment. From the intense heat of the sun, the cattle are unable to work during its influence; consequently, they are obliged to use the night-time in lieu of the day, the sultry effects of which it becomes requisite to avoid. The loaders, as before mentioned, being now at their station in the forest, the trucks set off from the barquadier about 6 o'clock in the evening, and arrive at their different places of loading about 11 or 12 o'clock at night; when the loaders, who are then asleep, are warned of the approach of the trucks by the cracking of the whips carried by the cattle-drivers, which are heard at a considerable distance; they arise, and commence placing the logs

upon the trucks, which is done by means of a temporary platform laid from the edge of the truck to a sufficient distance upon the ground, so as to make an inclined plane, upon which the log is gradually pushed up from each end alternately. Having completed their work of loading all the trucks, which may be done in three hours, they again retire to rest till about 9 o'clock next morning. The drivers now set out on their return, but their progress is considerably retarded by the lading; and although well provided with torch light, they are frequently impeded by small stumps that remain in the road, and which would be easily avoided in daylight; they, however, are in general all out at the river side by 11 o'clock next morning; when, after throwing the logs into the river, having previously marked them on each end with the owner's initials, the cattle are fed, the drivers breakfast, and retire to rest until about sunset, when they feed the cattle a second time, and yoke in again.

Thus goes on the routine of trucking during the season, the loaders being employed in the interim preparing the logs for the return of the trucks.

Nothing can present a more extraordinary spectacle than this process of trucking or drawing down the mahogany to the river. The six trucks will occupy an extent of road of a quarter of a mile,—the great number of oxen, the drivers half naked, (clothes being inconvenient from the heat of the weather and clouds of dust,) and each bearing a lighted torch; the wildness of the forest scenery, the rattling of chains, the sound of the whip echoing through the woods: then all this activity and exertion, so ill corresponding with the still hour of midnight, makes it wear more the appearance of some theatrical exhibition than what it really is,—the pursuit of industry which has fallen to the lot of the Honduras woodcutter.

About the end of May the periodical rains again com-

mence. The torrents of water discharged from the clouds are so great as to render the roads impracticable in the course of a few hours, when all trucking ceases, the cattle are turned into the pasture, and the trucks, gear, and tools, &c. are housed.

The rain now pours down incessantly till about the middle of June, when the rivers swell to an immense height; the logs then float down a distance of 200 miles, being followed by the gang in pitpans (a kind of flat-bottomed canoe), to disengage them from the branches of the overhanging trees, until they are stopped by a boom placed in some situation convenient to the mouth of the river. Each gang then separates its own cutting by the marks on the ends of the logs, and forms them into large rafts; in which state they are brought down to the wharfs of the proprietors, when they are taken out of the water and undergo a second process of the axe to make the surface smooth; the ends, which are frequently split and rent, by being dashed against rocks in the river by the force of the current, are also sawed off, when they are ready for shipping.

The average expense of mahogany cutting is usually estimated at 100*l.* Honduras currency, or about 70*l.* sterling each labourer per annum, independent of the capital sunk in purchase of the works, cattle, trucks, gear, crafts, tools, &c.

It will be borne in mind that the above account relates to the *Honduras* Mahogany; and Mr. Robert Brown has suggested to me that it may be a species different from the *Jamaica*, and perhaps the "*Cedrela Coroli folio amphori, fructu pentagono*" of Browne's Jamaica, where is the following observation: "This plant does not grow in Jamaica, and is only inserted here to show that there is another species of the kind known. It was discovered by Mr. Houston near the *Gulf of Honduras*, and is said to grow to a very large tree." If this be what we call *the Honduras Mahogany*, and different

from that of Jamaica, it is much to be lamented that its botanical characters are not yet known to us. I have already observed, that workmen make an important distinction between the two woods, and that the Jamaica kind is the most valuable.

Catesby says that when the fruit is ripe, the outer hard shell separates next the footstalk, and thereby exposes the seeds, which being broad and light are dispersed over the surface of the rocks. Such of them as happen to fall into the fissures, very soon send forth roots; and if these tender fibres meet with resistance from the hardness of the rock, they creep along the surface and seek another fissure into which they penetrate and swell so as to break the rock and thereby make way for the root to enter deeper.

In St. Vincent, where the Mahogany does not appear to be indigenous, the trees, as I am informed by Mr. Guilding, do not attain a greater height than fifty feet, and a diameter of eighteen inches. It flowers there in May and June. The bark is very astringent and bitter; and in its action on the human frame has been said to coincide nearly with the Peruvian bark.

Tab. XVI. *a.* Portion of a branch with a leaf and panicle of flowers (*nat. size*). *Fig.* 1. 2. Flowers; and *Fig.* 3. The tube of the stamens laid open to show the anthers and pistil and nectary (*magnified*).—Tab. XVII. *Fig.* 1. Flower deprived of the petals. *Fig.* 2. Front view of a flower (*magnified*). *Fig.* 3. Capsule with one valve removed, the others being in the act of bursting. *Fig.* 4. Receptacle of the seeds; *a.* point of attachment of the latter. *Fig.* 5. Seed. *Fig.* 6. The same with the integument removed. *Fig.* 7. Transverse section of ditto. *Fig.* 8. Seed germinating (*nat. size*).

SCOULERIA AQUATICA.

Cryptogamia Musci. Nat. Ord. Musci.

Gen. Char. (Scouleria, *Hook.*) *Capsula* sphærica, depressa, subsessilis, terminalis. *Peristomium* simplex, e dentibus 32, æquidistantibus, apice magis minusve fissis. *Columella* persistens, e capsulæ contractione valde exserta. *Operculum* planum, umbonatum, apici columellæ arctissime adhærens. *Calyptra* dimidiata.

Muscus *aquaticus, habitu fere Cinclidoti fontinaloidis, seu Anictangii aquatici, foliis nigrescentibus, curvis, minute punctatis, marginatis, uninerviis.* Capsula *foliis perichætialibus fere immersa.*

Scouleria *aquatica.* (Tab. XVIII.)

Scouleria aquatica. *Hooker in Drummond, Musc. Americ. ined.*

Hab. Aquis fluentibus apud "Observatory Inlet" in ora occidentali Americæ Septentrionalis: saxis enascens. *D. Scouler.* In rivulis montium "Rocky Mountains": et in fluvio Columbia, saxis. *D. Drummond.*

Caules laxe cæspitosi, fluentes (?), bis terve dichotome divisi, 3—5 uncias longi, flexuosi, nigri. *Folia* undique inserta, conferta, latolanceolata, recurva, basi planiuscula, reliqua acute carinata, margine incrassata, serrata, atro-viridia, nervo valido usque ad apicem acutum percurso instructa; *superiora* magis erecta atque viridia. *Substantia* compacta, punctis numerosis minutis seriatim dispositis. *Perichætialia* reliquis foliis terminalibus similia. *Fructificatio* terminalis. *Capsula* seta perbrevi imposita atque foliis fere immersa, sphærica, basi apiceque subdepressa intense fusca, glaberrima, nitida, demum, operculo secedente, contracta, valde depressa: hinc columella cylindracea insigniter exserta fit et, longo post seminum dispersionem, operculum planum umbonatum fuscum arctissime adhærentem, sustinet. Infra *Operculum* est ad apicem columellæ membrana horizontalis umbraculiformis. *Peristomium* e dentibus 32 reflexis, pro ratione capsulæ parvis, flavorubris, subangustis, transversim striatis, apice in lacinulis duabus vel tribus fissis. *Semina* parva, fusco-viridia, sphærica. *Calyptra* magna, fusca, obtusiuscula, hinc lateraliter fissa.

It gives me great pleasure, in looking over the valuable botanical collection made by Dr. Scouler on the north-west coast of America, to find a plant belonging to his favourite tribe, the *Musci*, which, constituting a new genus, I am thus able to dedicate to him. During three years that Mr. Scouler attended the College course of botanical lectures, I witnessed with satisfaction his increasing love for natural history; and although the anatomy and physiology of animals be his most favourite pursuit, and the one by which it is to be expected that he will, at a future time, rise to much fame,—yet botany has occupied a great share of his attention, and his herbarium includes much of novelty from the countries which, like a second Menzies, he has visited, and, as a naturalist, successfully investigated.

The present moss, Dr. Scouler gathered in running streams at Observatory Inlet, in a latitude nearly parallel with that of London, on the north-west coast of America. At first sight it might almost be taken for *Cinclidotus fontinaloides* or *Anictangium aquaticum*, but on a more careful examination, the fructification will be found as widely different from that of the species just mentioned, as from every other plant of the order. Here are thirty-two distinct teeth, more or less cleft at the extremity. The operculum does not fall away, but separates from the capsule by the sinking down (if I may use the term) of the upper part of the capsule, which thus assumes a highly remarkable yet constantly regular depressed shape; and long after the dispersion of the seed, and in the oldest state of the fructification, the operculum firmly adheres to the summit of the curiously exserted columella, from which it can only be removed by laceration.

Mr. Drummond has been so fortunate as to find the same plant in a part of the Columbia which borders upon the Rocky Mountains, and in other streams of that region; so that it is probably scattered over the whole extent of

country between the Rocky Mountains and the mouth of the Columbia and other places on the north-west coast of America. It does not, however, appear to extend to the east of that chain. Beautiful specimens will be published in Mr. Drummond's forthcoming volume of American Mosses.

Fig. 1. Plants (*nat. size*). *Fig.* 2. Leaf. *Fig.* 3. Terminal leaf. *Fig.* 4. Portion of the same. *Fig.* 5. Extremity of a fertile branch. *Fig.* 6. Calyptra. *Fig.* 7. Capsule before the operculum has separated from it. *Fig.* 8. Mature capsule after the dispersion of the seed. *Fig.* 9. Portion of the peristome. *Fig.* 10. Teeth of the same. *Fig.* 11. Seeds:—*more or less magnified.*

BRYUM MENZIESII.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN. CHAR. *Seta* terminalis. *Peristomium* duplex: *ext.* 16-dentatum; *int.* e membrana 16-laciniata, nunc ciliis interpositis. *Calyptra* dimidiata.

Bryum *Menziesii*; caule erecto subdenudato apice prolifero-ramoso, foliis ovato-lanceolatis, marginibus nervoque serratis, setis aggregatis, capsula pyriformi pendula. (TAB. XIX.)

HAB. Nootka. *D. Menzies.*—In loco "Observatory Inlet" dicto, in ora occidentali Americæ Septentrionalis. *D. Scouler.*

Radix longe descendens atque subrepens, dense ferrugineo-tomentosa. *Caules* gregatim crescunt, erecti, tripollicares et ultra, simplices, foliis fere denudati, paululum flexuosi, rubri, apice prolifero-ramosi, ramis unciam longis gracilibus iterum divisis. *Folia* caulina, inferne præcipue remota, parva, superne multo majora, erecta seu erecto-appressa, ovato-lanceolata, acuta, rigidiuscula, pellucida, subconcava, nervo ad apicem attingente, margine nervoque dorso distincte serrata, pallide fusco-viridia; ramorum his simillima sed minora magisque viridia. *Perichætialia* magis lanceolata caulinis majora, atque longe acuminata, sed minus serrata. *Flores masculini* caulem terminantes, conspicui, foliis ovatis acutis stellatim patentibus breviter acuminatis rufo-nervosis circumdati. *Antheræ* oblongæ, sessiles, reticulatæ, filis articulatis immixtæ. *Setæ* nunc solitariæ nunc duæ aut tres aggregatæ, ex eodem perichætio, semper ex apice caulis vel trunci, duas uncias longæ, erectæ, flexuosæ. *Capsula* pyriformis, pendula, rufo-fusca. *Operculum* conicum, obtusiusculum. *Peristomium ext.* dentibus longiusculis aurantiacis, *int.* membrana reticulata fulva, sedecim laciniata, laciniis marginibus denticulatis, ciliis his interpositis.

I HAD long ago in MS. dedicated this beautiful moss to its estimable discoverer, whose friendship to me has been so often mentioned in the volumes of my *Musci Exotici*; and I

regret that circumstances should, till now, have prevented its having been published in the way I had wished. It was gathered by Mr. Menzies at Nootka Sound, in 1787; and again, nearly forty years afterwards, upon the same line of coast, by Dr. Scouler.

This moss is quite unlike any species with which I am acquainted, having almost as much the habit of a *Hypnum*, especially of the dendroid kind, as of a *Bryum;* but the fructification is truly terminal, all the shoots springing from beneath the perichætium. The situation of the male flowers, too, if such they may be called, is equally terminal. In the shape and texture and spinous nerve of the leaf, this plant agrees with my *Hypnum spininervium* (*Musc. Exot. t.* 29.).

Fig. 1. Male plant. *Fig.* 2. Female plant (*nat. size*). *Fig.* 3. Portion of the extremity of a female plant. *Fig.* 4, 5. Leaves. *Fig.* 6. Perichætial leaf. *Fig.* 7. External teeth of the peristome. *Fig.* 8. Portion of the interior peristome. *Fig.* 9. Leaf which surrounds the male flower. *Fig.* 10. Anther and one of the accompanying jointed filaments:—*magnified.*

BRYUM GIGANTEUM.

Bryum *giganteum;* caule erecto simplici apice folioso, foliis rosaceo-congestis oblongo-spathulatis acutis marginatis serratis nervo ante apicem evanescente, capsula cylindracea horizontali. (Tab. XX.)

Hab. Locis petrosis, solo arenaceo, in facie septentrionali montis Chesapanny in Nepalia legit atque communicavit *Cl. Wallich*, 1820.

Caulis 3-pollicaris, erectus, inferne foliis fere omnino denudatus, tomento ferrugineo densissime obsitus, basi subrepens, superne non raro proliferus, in summum apicem solummodo foliosus. *Folia* numerosa, magna, 8 lineas longa, in rosulam congesta patentia vel erecto-patentia, oblongo-spathulata, viridia, acuta, laxe reticulata, areolis oblongis, margine concolori incrassato, superne

præcipue, argute serrata, nervo ante apicem evanescente instructa. *Seta* terminalis, solitaria, vel duæ aut tres ex eodem puncto, tripollicaris, lævis. *Capsula* semiunciam longa, cylindracea, horizontalis, rufo-fusca. *Operculum* brevi-hemisphæricum. *Peristomium* flavo-aurantiacum, *ext.* e dentibus transversim striatis: *interius* membrana reticulata sedecim-laciniata, laciniis perforatis vel profunde fissis apice unitis, ciliis brevibus duabus vel tribus his alternantibus.

NOTWITHSTANDING the many curious Nepalese mosses which I have already laid before the public, I still possess, by the friendship of Dr. Wallich, several new species. Among them the present will rank as the most remarkable, for the great size of all its parts; while at the same time, in point of general structure, it must be allowed to have great affinity with the *Bryum roseum* of our own country, and with the South African *Bryum umbraculum*, figured in Plate 133. of my *Musci Exotici*. From the former it may, however, be readily distinguished by its much longer and narrower capsules and margined leaves; from the latter, by the different direction of the capsule, more spathulate foliage; and from both, by the leaves being much more distinctly serrated, and by the much greater and even gigantic size of the plant.

Fig. 1. 2. 3. Plants: and *Fig.* 4. Single leaf, (*nat. size*). *Fig.* 5. 6. Leaves. *Fig.* 7. Summit of ditto. *Fig.* 8. Capsule. *Fig.* 9. Portion of the external peristome. *Fig.* 10. Portion of the inner peristome:—*more or less magnified.*

DICRANUM PHASCOIDES.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN. CHAR. *Seta* terminalis (Fissidentibus quibusdam exceptis). *Peristomium* simplex, e dentibus sedecim, bifidis, æquidistantibus. *Calyptra* dimidiata.

Dicranum *phascoides;* caulibus laxe cæspitosis simplicibus erectis, foliis erectis subulatis integerrimis, nervo mediocri, capsula oblonga perichætialibus immersa, operculo conico-acuminato, ore annulato. (TAB. XXI.)

HAB. Apud Sylhet Indiæ Orientalis. *D. Wallich.*

Caules subunciam longi, laxe cæspitosi, erecti, flexuosi, simplices, rubicundi. *Folia* undique inserta, erecta, subulata, omnino integerrima, laxe et obscure reticulata, tenuissime membranacea, flavo-viridia, nervo mediocri ad apicem attingente instructa, floris masculi vix nervosa, basi insigniter vaginantia, dilatata. *Flores* utriusque sexus terminales. *Capsula* oblonga, basi sublatiore, seta brevissima terminans, foliis perichætialibus immersa, lævis, fusca. *Calyptra* mihi ignota. *Operculum* brevi-conicum, rostratum. *Peristomium* e dentibus 16, rubris, bifidis, erecto-patentibus, striatis, annulo pellucido e serie simplici cellulorum constructo, cito deciduo, cinctis.

I REGRET that I have not seen the calyptra of this very interesting moss, which has so little the appearance of a *Dicranum* in its external habit, that, were it not for the very perfect state of the peristome in the specimens sent, I should scarcely have ventured to place it in that genus. Amongst the *Dicrana*, however, if such they still may be called, it comes nearest to that division which includes our *D. flexuosum;* but in them the calyptra is ciliated at the base, the nerve of the leaf is broad, and the seta is of considerable length.

Fig. 1. Tuft of *Dicranum phascoides* (*nat. size*). *Fig.* 2. Sterile plant. *Fig.* 3. Female plant. *Fig.* 4. Male plant. *Fig.* 5. Cauline leaf. *Fig.* 6. Perichætial leaf. *Fig.* 7. Leaf surrounding and including a male flower. *Fig.* 8. Capsule. *Fig.* 9. The same, having cast its operculum, and showing the peristome and part of the annulus. *Fig.* 10. Portion of the annulus. *Fig.* 11. Teeth of the peristome:—*magnified.*

RICCIA NATANS.

CRYPTOGAMIA HEPATICÆ. Nat. Ord. HEPATICÆ.

GEN. CHAR. *Capsula* substantia frondis immersa, membranacea, indehiscens, demum evanescens, stylo protruso terminata, seminibus tuberculatis repleta.

Riccia *natans;* fronde obovata cordatave dichotome lobata, lobis rotundatis margine subtusque longe fimbriatis, fimbriis reticulatis serrato-dentatis. (TAB. XXII.)

Riccia natans. *Linn. Syst. Nat. ed.* 12. *v.* 2. *p.* 708. *Smith, Engl. Bot. t.* 252. *Spreng. Syst. Veget. v.* 4. *p.* 236.

Riccia capillata. *Schmidel Icones. p.* 276. *t.* 74.

Lemna dimidiata. *Rafinesque in Amer. Monthly Magaz. v.* 1. (*fide Torrey.*)

HAB. In aquis stagnantibus per totam fere Europæam.—In America Septentrionali capsulas proferens prope Novam Eboracensem. *Dr. Torrey.*

Frondes subcongestæ aquæ superficiei natantes, semiunciam longæ, simplices, nunc obovatæ, emarginatæ, nunc obcordatæ, bis terve dichotome lobatæ, lobis rotundatis, planæ, carnoso-membranaceæ, intus cellulosæ, læte virides, reticulatæ, obscure costatæ, margine sæpe purpurascentes, subtus margineque dense fimbriatæ, fimbriis lineari-acuminatis, sub lente reticulatis, membranaceis, dentato-serratis, viridibus vel sæpissime purpurascentibus. *Capsulæ* semper in costam sitæ, substantia immersæ, superne convexæ, intus granulis vel seminibus numerosis, minutis, subsphæricis, tuberculatis, nigris repletæ.

THE fructification of this (hitherto) supposed species of *Riccia* has long been a desideratum; and though the plant has been known for a considerable time to the botanists in Europe, yet no specimens in fruit had been seen by them. At length in 1824 Dr. Torrey, Professor of Natural History at the Military Academy at West Point, New York,

was so obliging as to send me specimens in that state from the neighbourhood of that place, which I have already mentioned in the second edition of the *Muscologia Britannica.* These I think prove beyond a doubt that the plant is rightly placed in the genus *Riccia;* at the same time I must acknowledge that the fructification, in the only specimen I have yet received, is too far advanced to allow me to distinguish the *capsule itself.* But I know that in our common *R. crystallina* this part is thin and evanescent, and masses of seeds, from two or three or more capsules at length become confluent in the substance of the frond, and escape by the decay of the epidermis above them, leaving cavities or hollows in the frond. It is the case here also, and the seeds are of precisely the same nature in both.

Fig. 1. Plant of *Riccia natans* (*nat. size*). *Fig.* 2. Fructified plant. *Fig.* 3. Portion of the same, to show the inside of a capsule. *Fig.* 4. Another portion, showing the seeds of several capsules conglomerated. *Fig.* 5. Seeds. *Fig.* 6. Portion of the epidermis of the plant:—*magnified.*

PARNASSIA FIMBRIATA.

PENTANDRIA TETRAGYNIA. Nat. Ord. DROSERACEÆ.

GEN. CHAR. *Cal.* pentaphyllus. *Petala* 5. *Squamæ* 5, unguibus petalorum oppositæ, in setas apice glandulosas (plerumque) desinentes. *Stamina* 5. *Antheræ* posticæ. *Stigmata* 4, sessilia. *Capsula* 4-valvis, 1-locularis, valvis medio septiferis. *Semina* arillata. (*DeC.*)

Parnassia *fimbriata ;* squamis subpalmatis eglandulosis, petalis basi ciliatis, foliis radicalibus longe petiolatis reniformibus, caulina cordata sessili. (TAB. XXIII.)

Parnassia fimbriata. *Kön. in Ann. of Bot. v.* 1. *p.* 391. *Smith in Rees, Cycl. Decand. Prodr. v.* 1. *p.* 320.

HAB. In ora occidentali Americæ Septentrionalis. *D. Menzies.* In montibus " Rocky Mountains " dictis. *D. Drummond.*

Radix horizontalis, subfusiformis, fibrosa, superne basibus petiolorum vetustorum vestita. *Caulis* pedalis ad sequipedalem, erectus, gracilis, subangulatus, prope vel supra medium, unifoliatus. *Folia* radicalia 3—6, longe petiolata, reniformia, integerrima, multinervosa, *caulinum* parvum, cordatum, sessile. *Flos* terminalis, solitarius. *Calyx* 5-partitus, vel fere pentaphyllus. *Petala* 5, alba, obovata, subunguiculata, patentia, nervosa, ad basin pulcherrime ciliata. *Squamæ* 5, viridi-flavescentes, fusco-punctatæ, petalis oppositæ, carnosæ, cuneatæ, apice quinquelobæ, intus linea elevata longitudinali instructæ. *Stamina* 5, demum patentia: *Antheræ* oblongo-ovales, pallide flavæ, punctatæ. *Pistillum : Germen* ovatum: *Stigmata* 4, sessilia.

No botanist that I am aware has ever seen this very curious species of *Parnassia* in a living state, except Mr. Menzies, who had the gratification of discovering it on the north-west coast of America, and Mr. Drummond, who more recently found it in the interior, growing in pastures and marshy grounds, on the sides of mountains, particularly near the banks of lakes and rivulets. From a drawing and descrip-

tion made on the spot, aided by specimens communicated by Mr. Menzies, the present figures and descriptions are published.

Mr. Menzies observed that the stamens, after having performed their office of fertilizing the stigmas, which they do by approaching the pistil in succession, each remaining some time in contact with the stigmas, fall back in a horizontal position between the petals, giving an appearance of great regularity to the whole flower. It will be seen that in the structure of the scales or nectaries of the flower, the present species departs from the character hitherto laid down for the genus; but not sufficiently so to constitute a new one: and in habit the plant entirely accords with *Parnassia.*

Fig. 1. Petal. *Fig.* 2. Stamen. *Fig.* 3. Scale or Nectary:—*magnified.*

MENYANTHES CRISTA-GALLI.

PENTANDRIA MONOGYNIA. Nat. Ord. GENTIANEÆ.

GEN. CHAR. *Cal.* 5-partitus. *Cor.* infundibuliformis, intus hirta (vel cristata). *Stigma* bilobum. *Capsula* bivalvis, valvis axi placentiferis.

Menyanthes *Crista-Galli;* foliis radicalibus longe petiolatis reniformibus crenatis, scapo corymboso, laciniis corollæ undulatis cristatis. (TAB. XXIV.)

Menyanthes Crista-Galli, *Menzies MSS.*

HAB. In ora occidentali Americæ Septentrionalis. *D. Menzies.*

Radix horizontalis, crassa, fibrosa, superne squamis magnis, ovatis, fuscis, basibus vaginantibus petiolorum foliorum vetustorum. *Folia* omnia radicalia, longe petiolata, duas uncias longa, quatuor lata, reniformia, crenata, nervosa: *petioli* pollicares, superne canaliculati, basi insigniter dilatati vaginantes. *Scapus* pedalis teres, glaber, superne rubicundus. *Flores* corymbosi, pedunculis petiolisque bractea ovata munitis. *Calyx* profunde quinquefidus, laciniis ovato-lanceolatis. *Corolla* infundibuliformis, alba, 5-fida, laciniis ovatis, acutis, patentibus, margine undulatis, superne lamella erecta undulata cristatis. *Stamina* 5, exserta: *Antheræ* oblongæ, flavæ. *Pistillum*: *Germen* conicum. *Stylus* cylindraceus, deciduus; *Stigma* bilobum, flavum. *Capsula* conico-oblonga, calyce cincta unilocularis, apice dentibus 4 dehiscens.

THIS charming plant is another of Mr. Menzies's interesting discoveries on the north-west coast of America, growing in marshy mountain pastures in Prince William's Sound, and about Cape Edgecombe, in lat. 57°. The crest on the segments of the corolla in this species is exactly similar to that on the flowers of Roxburgh's *Menyanthes cristata,* which has also white flowers, but with the habit and mode of growth of a *Villarsia.* Here, however, there are no hairs upon the corolla, not even at the mouth of the limb, whilst in *M. cristata* that part is hairy.

Fig. 1. Flower. *Fig.* 2. Capsule. *Fig.* 3. Section of the same: *magnified.*

VOHIRIA APHYLLA.

Pentandria Monogynia. Nat. Ord. Gentianeæ.

Gen. Char. *Cal.* 5-fidus, brevis. *Cor.* hypocrateriformis, tubo longo basi tumido. *Stamina* in fauce corollæ, antheris subrotundis. *Stigma* capitatum. *Capsula* oblonga, bivalvis, seminibus scrobiformibus ad margines introflexos insertis.

Vohiria *aphylla*; caule aphyllo unifloro, corollæ tubo longissimo, laciniis ovatis. (Tab. XXV. A.)

Gentiana aphylla. *Jacq. Am. p.* 87. *t.* 60. *f.* 3.

Exacum aphyllum. *Willd. Sp. Pl. v.* 1. *p.* 638.

Vohiria uniflora. *Lam.—Rœm. et Schultes, Syst. Veget. v.* 4. *p.* 176.

Lita aphylla. "*Dietr. Gært. Lex.* 5. *p.* 531." *Spreng. Syst. v.* 1. *p.* 581.

Hab. In Martinicæ sylvis montosis vastis et humentibus: in cryptis truncorum luci vix perviis, non alibi. *Jacq.* In sylvis antiquis Sancti Vincenti, aut terra humida, aut in truncis semiputridis. *Rev. L. Guilding.*

Parasitica. *Plantæ* gregariæ. *Radices* e fibris albis subcarnosis crassiusculis. *Caulis* erectus, flexuosus, albus, simplex, crassitie pennæ corvinæ, omnino aphyllus, teres, articulatus, articulis vix unciam longis, basi squamosis. *Squamæ* ovatæ, amplexicaules, hinc fissæ. *Flos* ratione plantæ magna, terminalis, solitarius. *Calyx* brevis, 5-fidus, striatus. *Corolla* hypocrateriformis: tubo valde elongato, pallide flavo, superne gracili, apice (ubi stamina inserta) basique, præcipue, tumida; limbo quinquefido, flavo, patente, laciniis ovatis. *Stamina* in fauce corollæ inserta: *Filamenta* brevia: *Antheræ* rotundatæ, flavæ. *Pistillum*: *Germen* cylindricum, subpedicellatum: *Stylus* longissimus, filiformis: *Stigma* capitatum, obscure 3-lobum.

This singular plant, which has hitherto only been considered as a native of Martinique, was found by Mr. Guilding in the Island of St. Vincent, with its roots generally interwoven among those of other plants.

VOHIRIA TENELLA.

Vohiria *tenella*; caule aphyllo unifloro, corollæ tubo brevi, laciniis lineari-lanceolatis. (Tab. XXV. B.)

Vohiria tenella. *Guilding's MSS.*

Hab. In solo humido, Montis Sancti Andreæ, Insulæ Sancti Vincenti, rarissime. *Rev. L. Guilding.*

Omnibus partibus *V. aphyllæ* similis, sed minor, magis tenera, caulis articulis paucioribus multoque longioribus, corollæ tubo brevi (styloque similiter abbreviato) laciniisque angustioribus, colore roseo. *Fructus* est capsula, corolla marcescente tecta, bivalvis, valvis apicibus unitis marginibus intro-flexis et utrinque tectis seminibus numerosissimis minutissimis, arillatis, arillo longo ut in seminibus generis *Orchidis.*

A. *Vohiria aphylla.* *Fig.* 1. (*nat. size.*) *Fig.* 2. Upper portion of the stem and calyx. *Fig.* 3. Upper portion of the tube of the corolla, containing the stamens. *Fig.* 4. Pistil: (*magnified*). B. *Vohiria tenella.* *Fig.* 1. (*nat. size.*) *Fig.* 2. Capsule, burst, but still covered by the withered corolla. *Fig.* 3. Seeds with their arillus: *magnified.*

SCHULTES'S BOTANICAL VISIT TO ENGLAND.

It is by no means our intention in the present work, as we have elsewhere stated, to confine ourselves to the giving scientific and systematic descriptions of plants, together with the histories of those species which are valuable in an œconomical point of view. A part of our pages will be devoted to botanical information and notices, and even to translations from foreign publications, where we may think these calculated to interest and instruct; for it has been a subject both of regret and inconvenience to us, that in our country no botanical journal is published, though it gave origin to one which may well serve as a model for a future work of the kind, namely, König and Sims's *Annals of Botany*, of which two volumes appeared about twenty years ago. We possess many original memoirs connected with our favourite science; and with these, and the aid of our friends, we trust that the present publication may, in some measure, supply the deficiency of a more regular journal. We have selected among other matter for this present Number, a subject which cannot fail to be interesting to our countrymen; namely, the opinions which a learned German and Naturalist has been led to form upon the Botany, Botanists, and Scientific Institutions of the Metropolis, and some other parts of England, which he visited in 1824. These are published in the *Botanische Zeitung* for 1825, and are the substance of a letter, addressed from London by Dr. Schultes, a Professor of Landshut in Bohemia, to the celebrated Naturalist, Count Sternberg.

We must not be supposed, however, to assent to all that our author has said, either in regard to the objects which he saw, or to the views which he has been led to entertain of different persons and their actions. The shortness of his stay in England, and the circumstance of his obtaining information only through the

medium of a foreign language, may be justly offered as an excuse for some inaccuracies; while an useful warning may be derived from them, as to the caution with which we should, ourselves, in distant countries, form our judgements.

In the present instance, the mistakes to which we allude are of so trifling a kind, and are so amusing, that we only wish our English travellers always erred in an equally charitable and cheerful manner.

After a passage of twenty-four hours across the Channel, we landed at Harwich on the 26th day of August. Here we had an immediate opportunity of experiencing the vexatious interpretation of a regulation which, under Napoleon's government, would have been cried out against by the English as an invention of military despotism; but which in this land of liberty, as it is called, has subsisted for these hundred years. This law lays a tax of several pence on every pound-weight of books imported into the kingdom. Now we had with us on board the packet half a dozen folios, for the purpose of drying within their pages the plants which we should collect on our journey; and although these were only old works on Law and Divinity, which were useless except as paper for specimens, we were required nevertheless to pay a tax amounting to thirty florins; and this merely because they were in the form of books. Much playful argument and some serious remonstrance were employed on this occasion; and we at length prevailed on the ignorant officer, who could not even read the titles of these works, to allow them to remain in his hands, (where they would probably be useless except to curl his old red wig withal,) by means of which arrangement we escaped the heavy impost, but were compelled to take our plants, one by one, out of these folios, and to purchase, at a high price, fresh paper in Ipswich; thus losing both time and money by the bad interpretation of a worse law. May this our unlucky experience serve as a warning for such botanists as shall hereafter travel in England, not to dry the plants which they may collect on their journey in old books with brass clasps.

We passed up the river Orwell with the tide, to the little dull town of Ipswich; admiring in our way the beautiful banks which

skirted this stream, and which seemed to form one grand park. What particularly struck us here was the deep full verdure of the meadows, and the almost black green of the trees, shrubs and plants, which grew in the hedges. We have frequently heard censures passed, and even made them ourselves, on the intense colours of the figures of plants in the *Flora Londinensis* and *English Botany;* but we now plainly perceived that our complaint was unfounded, the prevailing hue of the vegetation being even of a deeper tone than it is represented in those plates. Except *Ulex europæus, Genista anglica,* and a species of *Rubus,* (which, though called by all the botanists of this country *R. fruticosus,* is not the plant which bears that name on the continent, of which the corollas are always pale red,) we observed nothing in the Flora of the roadsides which struck us as being different from that of Germany.

On the 27th, about noon, we proceeded in the mail-coach from Ipswich to Norwich, where, by a fortunate circumstance, we accomplished the object of our journey thither. Sir James E. Smith, to whom we made this pilgrimage, had just returned home from the country, and was on the point of again visiting his friends when we called on him at his beautiful house. Our joy was great at finding this most respectable man so far recovered from the severe illness which had threatened his life, as to be again enabled to devote his leisure hours to the *amabilis scientia.* He was then employed in revising some printed sheets of the third edition of his *Introduction to the Study of Botany.* Sir J. E. Smith displayed to us the treasures of his collection, (in reality the only one of its kind,) with a courtesy and kindness which are peculiar to great and well-educated men; and which in this truly noble person are heightened by such charms of gentleness and affability, as cannot fail to attract to him most forcibly even such individuals as have but once enjoyed the privilege of his society. The books of Linnæus, with their margins full of notes in the handwriting of the immortal Swede; many valuable MSS. of his, not yet published; the Linnæan Herbarium, in the same order and even occupying the very cases which had contained it at Upsal, (little as the old-fashioned form of these cabinets corresponds with the elegant arrangement of Smith's museum); the collection of insects, shells and minerals, which had belonged to this

second creator of Nature;—all these are arranged and preserved by Sir James with a scrupulous care which almost borders on a kind of religious veneration. The relics of Mohammed are not enshrined with more devotion in the Kaaba at Mecca, than are the collections of Linnæus in the house of Sir J. E. Smith at Norwich. Whilst we bless the Providence that has placed these treasures of the Northern Prophet in the hands of such a Caliph, from whom (as Sir James, alas! has no family) they will pass into the possession of some valued friend or person who knows how to appreciate and feel their high value, and who will respect them as national property,—we, of the continent, must ever lament that they have fallen to the lot of the "*toto disjunctos orbe Britannos;*" as it is, unhappily, impossible for every botanist to make a voyage to this island, here to compare his specimens with those of Linnæus: "*Non cuivis homini contingit adire Corinthum.*" And yet, long as a *tribunal botanicum* or a *synodus botanica* shall continue to be earnestly desired for that common good, which is as much the object of the botanist as of any other child of Adam, so long must we wish that the following plan, which is the only practicable remedy to the distant situation of Linnæus's collections, should be adopted.—We would propose that in every place where botany is pursued with energy, a kind of Filial or Branch Herbarium (if I may so call it) should be established; consisting of such plants only as have been accurately and faithfully compared with the original collections of Linnæus, Thunberg, Pallas, Vahl, Desfontaines, Ruiz and Pavon, Willdenow, Humboldt, &c. The excellent Sir J. E. Smith would willingly open his treasures, and allow every facility to those who held these views.

If there should arise any opulent botanist on the continent, or if any of the Governments there should institute a complete herbarium, possessing all the Linnæan species, (which it would not be difficult at the present day to gather together,) and if such herbarium were by the proprietor allowed to be compared by an able botanist with that of Linnæus; we should then have in that country a *faithful copy* of the Linnæan Herbarium, which would enable us, in doubtful cases, to determine with precision what it was that the great Swedish naturalist had meant by any given species. Without such a comparison of the larger collections with each other; for example, that

of Berlin with that of Paris, and one or other of these with the Banksian or Lambertian herbaria,—no degree of certainty can be expected; and from the increase of extensive private unverified collections, the science must labour under a heavy disadvantage in the consequent accumulation of synonyms. If Sieber had identified the plants gathered by him in Crete and Egypt with many of those previously collected by Sibthorpe and Desfontaines, much doubt would have been removed; and if the late travellers in Brazil, Prince Nieuwied, Auguste St. Hilaire, Martius, and Pohl, had compared their treasures before describing them, many useless synonyms would never have existed. To travel from one herbarium to another, and to carry about, in the memory only, the characteristics of doubtful species, may well be found an almost impracticable task; and the confusion to which such an attempt is apt to give rise may be seen exemplified in one of our latest large botanical works. To decide upon plants which we have not seen, and only know from an erroneous diagnosis or imperfect description, is like a blind man judging of colours: "*Il faut voir, dit l'aveugle.*"

Besides the Linnæan herbarium, Sir J. E. Smith has a large collection of plants of his own formation, which is especially rich in the productions of New Holland and Nepaul. The worthy Professor Wallich at Calcutta, whose health has lately suffered from an Indian climate, has greatly contributed towards the latter. The Linnæan specimens, as well as Sir James's private herbarium, are very well preserved; and after the old plan, which is now seldom followed on the continent, they are fastened down on a folio sheet of paper, and washed over with a solution of corrosive sublimate. Sir James has also under his care the plants of Sibthorpe, to aid him in the publication of his *Flora Græca*, which is now nearly completed.

Among the papers of Linnæus, their present possessor found a number of copies of two pamphlets by this illustrious man, which do not appear to have been ever published. One of them bears the title of "*C. Linnæi Observationes in Regnum Lapidum*," and contains a view of the mineral kingdom, so far as it was known at the time of its being printed: the other is intitled "*Orbis eruditi Judicium de Caroli Linnæi, M. D. Scriptis.*" Both fill a complete sheet of letter-press. Sir James was so kind as to give a copy of each to

my son and myself, with his own signature affixed. The latter of these pamphlets, *sine loco et anno,* like the first, appears to be a defence of this illustrious man extorted from him by some of his envious and prejudiced contemporaries. But what redounds as much to the honour as it must have done to the peace of the cautious and amiable Linnæus, is, that after having composed this paper, which consists entirely of the testimony which was borne to his character by the principal naturalists of his time,—such as Boerhaave, Burmann, Sloane, Dillenius, Jussieu, Haller, Gesner, Gleditsch, Breynius, &c. &c.—he afterwards entirely suppressed it; and thereby deprived his opponents of those fresh subjects of disputation, which are sure to arise on such occasions, and which only furnish ground for sincere pity for the contending parties. It would appear as if the motto which Linnæus had chosen for this paper,

> "*Famam extollere factis*
> *Hoc virtutis opus,*"

had animated him with this feeling even while composing it.

The case is however quite different when the possessor of the Linnæan herbarium, and of the other treasures left by the creator of the *amabilis scientia,* is called on to defend himself in a couple of pamphlets against a learned body, under the firm of Universitas Cantabrigiensis, and before the whole European public to advocate the laws and privileges of mankind, and consequently those especially of his own country, against the usurping ignorance and fanaticism of the learned head of one college, who in our German language would be termed the Pro-rector, and against the fawning sycophancy of some slothful member*. In such cases, we may well exclaim, as Smith has done in his defence, in the words of Milton,

> "I hate when Vice can bolt her arguments,
> And Virtue has no tongue to check her pride."

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* The titles of these two pamphlets, which are scarcely known in Germany, and in which Sir J. E. Smith defends the eternal laws of truth, are: "Considerations respecting Cambridge, more especially relating to the Botanical Professorship; by Sir J. E. Smith, M.D. F.R.S. President of the Linnæan Society:"—and "A Defence of the Church and the Universities against such injudicious Advocates as Professor Monk and the Quarterly Review; by Sir J. E. Smith," &c.

The whole history which Sir J. E. Smith here gives,— and which I shall relate somewhere else, as characteristic of the English Universities, the question being one which affects the botanical world and the public at large,—is briefly as follows :

The present Professor of Botany at Cambridge, Mr. Thomas Martyn, having been for many years prevented from lecturing by illness, confided his office of Professor, in so far as it was the foundation of Walker, to the most eminent botanist in England, the President of the Linnæan Society, Sir J. E. Smith. Most of the members of the University were well pleased with this choice, inasmuch as it advanced the celebrity of the high school at Cambridge. In compliance with the desire of Martyn, Smith sacrificed his leisure, went to Cambridge, and there proposed to renew the lectures on botany, which for many years had been discontinued. But the Pro-rector of this University, Mr. Monk, formally laid an interdict on the Knight and President of the Linnæan Society, Sir J. E. Smith, prohibiting him from ascending the rostrum, because he was,—a Dissenter!—that is, a Christian of a different persuasion from Mr. Monk. What would be said of a German University which for such a reason should exclude so distinguished an individual as Smith? Had Cambridge been now in the situation of France, groaning under the rod of such an obscure fanatic as the Bishop of Hermopolis; or had Sir James, in any of his publications or in any part of his conduct, shown the least trace of irreligion,—then the University would have been justified in this procedure : but not only have all the works of Smith testified their author to be, in the highest sense of the word, a religious character; but his whole life has been a series of the exercise of Christian virtue and elevated piety. Who would have believed that an University within the walls of which the immortal Erasmus Roterodamus once taught, and which had produced such a man as Milton, should ever, and even in the twentieth year of the nineteenth century, sink to such a depth of barbarity! (*bestialität!*) But "*omnia jam fient*" &c.; and we must not wonder that in this island, as well as on the continent, there should be instances of the existence of dull heads and infected hearts in Universities, when the direction of these institutions is entrusted to the learned corps of *frères ignorantins.*

The few hours which Sir James Smith's kindness induced him to devote to me, though he was ready prepared to set off on a journey to join his *Smithia,* (a lady of rare talents,) passed away like a moment of time; just as the sweetest periods of life seem to fleet upon the swiftest wings. I have rarely beheld a more noble countenance; one indicative of such candour, simplicity and kindness, united with so much clearness of intellect, as that of Sir J. E. Smith; and the expression of his features will never be obliterated from my memory.

Sir James obtained for my son and myself admittance to the noble hospital at Norwich; after which we quitted this romantic and prettily situated city, and proceeded by way of Newmarket to Cambridge. The coach, like all those which carry the mail in England, went at too rapid a rate, and the day closed too early, to allow of our making many observations on the Flora of the somewhat barren country which lies between Norwich and Newmarket. We only noticed, from the road, some beautiful country seats, and a plantation of *Pinus sylvestris,* which, like the other tribes of Fir, is a rarity on the plains of England, not being a native of this country.

We hired a postchaise from Newmarket to Cambridge, which is situated in a rather bleak neighbourhood. I shall describe the University in some other place, and only give a few words to the Botanic Garden, which, as far as such an establishment can be known by a Catalogue, is already known on the continent by the third edition which the deceased Donn and Pursh, together with Mr. Lindley, published in 1823. I had hoped here to meet my late friend Dr. E. D. Clarke, Professor of Mineralogy, who once spent an evening with me at Landshut, on his return from Egypt, and had invited me in return to see him and his Garden at Cambridge. He knew not that he was asking me to come and see his effigy, when he gave me the invitation;—the marble bust which the University has placed to his honour in the library, is all that was left of my friend. I was told that Dr. Clarke's death was occasioned by the irritation that an insect gave rise to, and which was drawn into his nostril by smelling of a flower.

The Garden at Cambridge contains about five acres of very bad ground, and there are from five to six thousand species of plants, the

greater part of them cultivated in beds. It does not present so pleasing an appearance as the Dutch botanic gardens, but is, however, kept very neat, and is well arranged. The founder of this institution was the great Dr. R. Walker, Vice-master of Trinity College, who purchased the ground for 1600*l.* Bradley, the earliest botanist who paid exclusive attention to the succulent plants, was the first Professor of Botany at Cambridge, whom the celebrated Sherard recommended to the University. There were no Lectures given here on botany till the year 1724; so that this eminent university is far behind many of those in Germany in this respect, which long before that period had supported Botanical Professors and Gardens. Bradley ceased to give lectures six years before his death, when Sherard, and the great physician to the royal household Sloane, recommended John Martyn to the situation. Still, in the year 1734, Martyn discontinued his lectures, as there was no botanic garden, and he met with no support. "Botany slept," as Sir J. E. Smith says, "from 1734 till 1761, when R. Walker raised it from a deep slumber. The Professor of Botany had neither salary nor student." Walker provided both; and aided Martyn, who transferred his office to his son, Thomas Martyn, then twenty-six years of age. The latter has been for the last three years prevented from lecturing by age and infirmity; and in 1818 he transferred his situation, (inasmuch as it related to Walker's foundation,) to Sir James E. Smith. But Monk, by interdict and proscription, prevented this worthy man from performing the duties of the Professorship; and the University of Cambridge appears to feel as little as it would have done a hundred years ago, that it has for the last six years been deprived of instruction in one of the most beautiful and useful of sciences. The care of the Garden is committed to Mr. Biggs, whom we did not find at home. The stoves are well built, and they may have been hitherto large enough; but the progress of the science will soon cause their size to be insufficient, as they extend only to 216 feet. A building was erected some years ago, for the lecture-rooms of the Professors of Botany, Chemistry, Mineralogy, and Mechanics. The Alpine plants, among which are some rare species from the Scotch Highlands, are very properly cultivated in small pots, and placed during winter under glass. The

assistant-gardener, who conducted me through the grounds, was not able to tell me the annual expenditure of the institution. The work-people receive two shillings a day.

The Library of the University contains many rare works; but little attention seems to be paid to Natural History: and even the collection of Minerals is not considerable, when compared with many of our mineral cabinets in Bavaria.

Our stay in London was extremely short; and we were anxious to take advantage of one of those clear days which are so uncommon in England, in order to visit Oxford, which is only about fifty-eight miles distant from the metropolis. We performed this distance in less than six hours, though at some risk of breaking our necks. Sir J. E. Smith had been so obliging as to give us a letter to his friend Dr. Williams, Professor of Botany and Librarian to the Radcliffe Library at the University of Oxford; and through the politeness of this highly estimable person we obtained a view of the treasures of natural history in Oxford, and also of the Radcliffe Library and Hospital.

The Botanical Garden at this University is the oldest in England, having been founded by Henry Lord d'Anvers Earl of Danby, in 1622, when the first stone was laid of a wall fourteen feet high which still exists, and which it took eleven years to build, at an expense of 5000*l.* The erection of the gate by Neklaus Stone, for which Inigo Jones furnished the design, cost 500*l.* On either side of the entrance to the garden stands a statue; one of king Charles the First, and the other of his son Charles the Second: these were purchased with the amount of a fine, laid on the celebrated antiquarian Anthony à Wood, as a punishment for a satire which this good old man had ventured to publish in the first edition of the *Athenæ Oxonienses,* against the Earl of Clarendon. This garden had originally been the burial-place of the Jews, who lived in great numbers at Oxford, till the noted banishment and destruction of these state creditors in the reign of Edward the First 1290. It was afterwards enlarged, and at present includes five acres. This addition of ground was however but a trifling improvement, and the danger of inundation to which it is exposed both in winter and summer still exists. The water frequently stands knee-deep above the plants; and as the lower parts of the garden cannot be sufficiently raised without an immense ex-

pense, these portions are left quite uncultivated. The active gardener, who is a Scotchman named Baxter, devotes his attention chiefly to the Cryptogamia; partly from mortification at finding it impossible to make the garden such as he could wish. He is preparing a *Flora Cryptogamica* of the environs of Oxford; and he showed us the first number of this work, containing specimens very neatly laid out, to which we must invite the attention of our countrymen in Germany. Mr. Baxter also cultivates with zeal the English Willows, having a living individual of almost every species, in a proper *Salicetum*. To the Grasses, likewise, he gives much attention; and, from the experience of several years, he is enabled to decide that *Agrostis verticillata, vulgaris, decumbens, fasciculata* (Curt.), and *stolonifera*, are distinct species; which, when subjected to the same culture for a great length of time, still continue to preserve their characteristic marks. This industrious man,—with the assistance of three persons, each of whom receives two shillings per day,—cultivates between four and five thousand species of plants in the wretched houses of this garden, though in fact there is only one stove, properly so called, and this is much too small. Those which grow in the open air are, like the plants of Cambridge, arranged agreeably to the Linnæan method, and separated into the indigenous and foreign kinds; and both of these are again divided into annual, biennial, and perennial, by which the study of the allied species becomes difficult. They are partly cultivated in beds, partly in separate squares; without any view to the effect which this must naturally offer to the eye.

Although the Oxford Garden is inadequate to the purposes of botanical instruction in the present state of science, and though the excellent Dr. Williams has been prevented from lecturing this year by the weakness of his sight, it yet possesses, in the Library which has been judiciously added to it, a treasure which no other institution of the kind can boast, namely, the Herbarium and MSS. of Dillenius and of Sherard, with the collection of books that had belonged to these two *Coryphi*. The first contains almost all the original specimens of Cryptogamia, figured by Dillenius in his work which is now become very scarce; and they are in very good preservation. Perhaps Professor Williams will give us a new edition, with authentic and accurate copies of the plates in this typographical rarity; and add to them the marginal notes of Dillenius. William Sherard

not only left to the Garden of this University his valuable herbarium, and his rich library which includes some scarce works that are even wanting to that most complete of botanical libraries, the Banksian; but he also bequeathed a sum of 3000*l*. to the University, that with the interest thence arising a Professor of Botany might be supported. It is well known that the first person who received this salary was a German, Dillenius.—A Regius Professor, paid by Government, was appointed in 1793; and this individual was the celebrated Sibthorpe, whose herbarium (now in the hands of Sir J. E. Smith for the publication of the *Flora Græca*) belongs likewise to the University. A circumstance which stamps with increased value the herbaria of Dillenius, Sherard, and Bobart, is, that the two first have, annexed to their well preserved specimens, the synonyms and references of contemporary authors, particularly those of Plukenet, Petiver, and Sloane, in their respective handwritings, as that of Sibthorpe bears the Linnæan names; by which the very frequent old synonyms are well elucidated. I suggested to Professor Williams the advantage that would arise from causing some young botanist to draw up a complete catalogue of the plants in the collection of Dillenius and Sherard, copying at the same time the synonyms, which after a previous revision might be published. The science of botany, or at least its history, would thus, in my opinion, gain immensely. It is much to be desired, in general, that a list of all the great Herbaria were printed; each plant having its place of growth and first describer noted: this would offer great facilities to the compilers of future monographs on different genera;—at least a person would know where to look for what he might otherwise long seek in vain.

Professor Williams related to me the following anecdote respecting Linnæus, which is traditionally preserved in the Oxford Garden, and which deserves to be also known in Germany.—Linnæus presented himself at Oxford to Dillenius and Sherard, being then a very young man, and his system having as yet made but little noise in the world of science. The latter received him with cordiality; but Dillenius was very cool, and said to Sherard, "This is the young fellow who is putting all botanists and botany into confusion." Linnæus did not understand the English language, in which this remark was made, but yet he recognized in the word *canfiuschjen* (so pronounced by Dillenius in his German accent), the Latin epithet *confusio.*

He was silent: Sherard and Dillenius walked up and down in the garden with their new acquaintance, and stopped by a wall overgrown with *Antirrhinum* (*Linaria*) *Cymbalaria;* a plant upon which they were desirous to have the opinion of Linnæus, as much doubt had existed respecting it. Linnæus removed these difficulties with his natural perspicuity. The gentlemen again pointed to a second, and a third plant, of which they felt uncertain; and again the Swede explained the dubious points with perfect ease. Dillenius was surprised; and Sherard observed to him that he could perceive "no confusion at all" in Linnæus. He invited the stranger to dine with him; and during the several days that Linnæus remained in Oxford, he found that the dislike which Dillenius had at first entertained towards him, wore gradually away, and gave place to esteem and friendship. On taking leave, Linnæus remarked to Dillenius, that he should be very sorry to have brought *confusion* into the Garden at Oxford. Dillenius blushed, and apologized for the hasty word which had escaped his lips.—I entertained Dr. Williams with an anecdote of Dillenius, in consequence of which this meritorious man is, in Germany, regarded as a kind of simpleton. "Most of my countrymen," replied Dr. Williams, "look upon him as not a hair better."

After having gathered some twigs of trees, planted here by the hands of Dillenius, as a kind of memento of him, we quitted the garden, and followed Professor Williams into his temple the *Bibliotheca Radcliffiana*. A richer collection than this in works of natural history, physic, and medicine, except perhaps that of Sir Joseph Banks, does not exist in any country.—I pass over the description of the beautiful building which contains it, though one of the finest in Oxford; and from the cupola of which a most noble view of the city is obtained, being the situation whence the panorama of Oxford was taken. The foundation of this edifice was laid in 1737, and it was opened in 1749 by the executors of Dr. Radcliffe; who had left to the University a sum of 40,000*l.* to build the Library, with 150*l.* a year for the librarian, and 100*l.* annually to purchase new books, and as much more to defray the expense of needful repairs. This income would be quite inadequate to cover the cost of procuring yearly the requisite new publications; but this desirable object has been attained by an arrangement with the Bodleian Library. To the latter institution every author in England is by law compelled to send a copy of

his book; and the Bodleian has agreed to cede to the Radcliffian Library all those upon medico-physical subjects. The experience which, as a naturalist and physician, Dr. Williams possesses, renders his services far more valuable to the institution than the inefficient labours of the learned pedants, to whom the office of librarian is frequently committed. The books are arranged in ethnographical order.

The country between Oxford and Henley, half-way back to London, is so beautiful that we determined to perform this distance on foot. Our expectations of a new Flora were not however realized: except *Ulex europæus,* and in some places a great number of Ferns, we met with nothing more interesting than what usually occurs with us. At Henley we took a stage-coach, and passing the villas of Herschel and Banks, arrived in London.

To become properly acquainted with the botanists and state of botany in London would require half a year at least, and we had only half a month in which to attain this object; and were obliged to œconomize every moment, as we had all the Hospitals also to visit. We particularly desired to make the acquaintance of Mr. Don; through whose means we hoped to see the Linnæan Society, and the herbarium of Lambert. We had been told so much of the politeness of this learned man, that we hope he will ascribe the great degree of trouble which we occasioned him, to the character for affability which he every where possesses. The preference which the first botanists in London have shown for Mr. Don, by entrusting their treasures to his charge, is as honourable to themselves as to the object of their choice; and the "delightful science" is an equal gainer.

Mr. Don is a man in the flower of his age, and, like all the Scotchmen whom we had the pleasure of knowing in London, a person of remarkable frankness and candour. We are greatly obliged to him for the reception which he was so kind as to give us; he obtained for us a view of the Linnæan Society's apartments, Soho-square: a *Cyathea* from Nepaul stood on the stairs, as high as the house; it might have been used on its voyage to Europe for the mast of a ship. The herbarium is in the hall; very beautifully arranged, with British elegance and solidity. The cases in which the animals, chiefly birds, are preserved, are made of the wood of *Flindersia au-*

stralis. The rich library of this establishment contains many valuable works, which are wanting to the great universities, academies, and national collections of the continent. The hall in which the meetings of the Society are held, struck us as being a far finer apartment than the House of Commons; and we even thought this latter very inferior to the House of Commons at Munich, which is only used every third year; while again the Hall of Assembly of the Academy at Munich is a mere lumber-room compared with that of the Linnæan Society. The busts of Linnæus and Banks, and of our countryman Trew, and the portraits of Solander and Pulteney, ornament this elegant apartment. All that we were, unfortunately, able to see of Sir J. Banks's herbarium and library was from the windows of the Linnæan Society's house; for Sir Robert Brown was gone to Naples, and had taken with him the key of the Banksian collection*. We were more successful at Count Lambert's, though with the disappointment of not finding at home this venerable sage of seventy years, who has made such sacrifices to botany. He was at his country-seat of Boyton in Wiltshire, some eighty miles, we were told, distant from the capital. Mr. Don, however, had the key to Lambert's *sanctum;* and his goodness afforded us a view of its botanical treasures, accumulated from all parts of the world. The collection of plants contains above 36,000 species; and if its increase continues with its former giant strides, it will soon exceed every other. This immense herbarium, of which the noble proprietor has given some information in the second part of his magnificent work on the genus *Pinus*, consists of no fewer than fifty herbaria, each of which would singly be worth to a botanist more than any pearl in the Mogul's crown. I shall here only mention a few of them, besides the great English one, of the Count's own formation: viz. the plants of Afzelius and Balduinus; the collection made by Baxter in New Holland; the herbaria of Broussonet, Brown (the author of a work on the botany

* We really think that it would have been quite an overstretching of that public-spirited liberality, with which both the former and the present proprietor of the Banksian collection have ever opened its treasures to the use of science, if *Sir Robert Brown*, when going to Italy, had thought it necessary to leave the key of Sir J. Banks's library and herbarium in the door.—Ed.

of Jamaica), of Lord Bute, Hill, and Caley (the latter had spent seven years in New Holland); of Cavanilles, Clarke (who had accompanied Cripps); Durandes, Forster, Flinders, Forsyth, Fraser, Gouan, Hamilton (formerly known under the name of Buchanan), Hawkins, and Sibthorpe; Hibbert, Hudson, Jack, Captain King, Governor King; a Japanese herbarium (considered as very valuable); the plants of Martin (the well known prize, from which Rudge described his *Flora Guyanensis*); of Masson, Arch. Menzies, of Nuttall (from the Missouri); Pallas, Governor Philipps, Ponthieu's plants from Jamaica; the museum of the Duchess of Portland, Pursh's herbarium, Raffles's, Richardson's (who was with Franklin), Lieut. Roes (Ross's?), Roxburgh's, Ruiz', and Pavon's (Count Lambert paid 1500*l.* for the latter); Sabine's, Seaforth's (from Barbadoes), Sello's, Sieber's, Staunton's, White's (from New South Wales), Wilkins's, Wiles's, &c. &c. If the number of these collections surprises us, the magnificence and variety of the specimens, and the care with which they are preserved,—some under glass, as many of the *Arundinaceæ;* some in pasteboard boxes, others in mahogany cases; while entire branches of several species of *Banksia*, *Dryandra*, and *Protea*, are kept, each in their proper place; with tubes of the *Sarracenia* and *Nepenthes* carefully laid on fine cotton and stuffed with the same material, so as to look as perfect as when growing in the stove,—must excite our still greater admiration. The *Cinchonas*, which are among the grandest of Lambert's favourite tribes, fill three parcels, each probably containing two hundred specimens. This truly noble Count,—who is to England what Count Sternberg is to Bohemia, Count Hoffmannsegg to Saxony, and Baron De Lessert to France,—is still by no means among the number of those English Lords "*quibus Pactolus fluit:*" but with his well employed thousands he has done more for science, and consequently been more useful to mankind, than many with their hundreds of thousands. His name will therefore live in the annals of improvement, and for centuries and centuries be held in grateful remembrance.

Whilst we were employed in viewing Count Lambert's treasures, a little man dressed in black entered the apartment; and he cast a glance full of sorrow and indignation upon some packages which belonged to the herbarium of Ruiz and Pavon. This look attracted

my attention, as did the general elevated physiognomy of this person. I could not suppress my curiosity, and asked Mr. Don who this little man might be. When he replied, *Señor Lagasca!* I threw myself into the arms of my old friend, who was much puzzled to imagine who I could be, for we had only known each other by correspondence, which had continued for some years; and here we met, as in a dream, where we least expected to see one another. Poor Lagasca! he had not only lost all his domestic happiness, (his wife and five children being in Cadiz,) and his fortune; but also his great herbarium; the manuscript of his Flora of Spain, on which he had been employed for more than twenty years, and which was ready to be printed; even the manuscript of his Monograph of the *Cerealia*, with the dried specimens belonging to it, on which he had laboured at Seville and there completed it,—all, all were destroyed! He saved nothing from the great shipwreck of that Cortes to which his talents and virtue had raised him, but his own life. Far from his beautiful country, and from his beloved relations, he now lives in the foggy and expensive London, where he participates in the afflictions of so many of his worthy and exiled countrymen!

Lagasca and I met almost daily after this interview, and made some botanical excursions together: among other places, to the celebrated gardens of Kew. We did not see Mr. Townsend Aiton, as he had been called away to Windsor; but in this well known garden, whose Catalogue has given it so much celebrity, we did not find the pleasure that we had anticipated. We were disappointed particularly in the plants which grow in the open air, which are not so accurately named as those in the Göttingen Botanic Garden, superintended by Schrader: sometimes the same species is marked with two different names. The garden at Kew consists of a fine park, and a large botanical garden of about twenty acres. What we usually term a park in Germany is like anything rather than what receives the same appellation in England; and which is neither more nor less than a wood, in which nature and art seem to dispute for the original formation and present possession. As in a wood, one may walk, ride and drive about it, without risk of interruption. English parks are in fact beautiful woods, and nothing more; and it will ever remain one of the most difficult problems in the delightful science of laying

out pleasure-grounds, so to plan a charming wood, as that he who is in it shall not know whether he be in a grove or a house. We have on the continent many exquisitely formed gardens, under the name of English ones; but an English park I have only seen in England. The Botanic Garden at Kew is surrounded by high walls, and intersected into long squares. With regard either to its plan, or its nine or ten stoves, it will not bear a comparison with those of Malmaison, or the Grand Duke of Weimar, of Prince Esterhazy at Eisenstadt, or even with the botanical division of the Imperial Garden at Schönbrunn. A Supplement to the *Hortus Kewensis*, under the inspection of Sir Robert Brown, will soon be published: many species which were formerly cultivated here, are said to be lost. Our countryman, the celebrated flower-painter, Mr. Francis Bauer, with whom I had the honour of being acquainted some years since at Vienna, resides at Kew. I regretted his absence from home when I called to pay my respects to him.

The garden of the Horticultural Society at Turnham Green, scarcely half an hour's distance from Kew, is of far greater importance to the art of gardening, which is indeed the proper design of the study of botany. This establishment, which is described in the *Horticultural Transactions*, is likely to prove of incalculable advantage to Britain and to all Europe: every branch of Horticulture, except the ornamental, being here pursued to the greatest extent and according to the purest scientific principles; such as the cultivation of fruits and vegetables, both forced and in the open air; and of flowers, whether abroad or under glass. No less than thirty-three acres of land are destined to the accomplishment of the necessary experiments, surrounded by a lofty wall, and again walled off into partitions. By this plan, however, the Society appears to have intentionally sacrificed the picturesque. About forty workmen are kept in this Vineyard of the Lord, who are under the superintendence of a very able gardener, Mr. Munro. At present there are five stoves, two of them built after the newest plan, with convex windows, which are found to be highly advantageous. A very large house is to be erected next year, and heated by steam. We of Germany must long want a great advantage which the English possess in their stoves; namely, the very slender iron frame-work in which the panes

of glass are inclosed, thus uniting durability with the advantage of admitting the greatest quantity of light. The price of these iron frames in England, where every thing is six times as expensive as with us in Bavaria, amounts to no more than what we should pay for a frame of wood that would not last above a year. The Horticultural stoves contain many valuable plants from China and Sierra Leone; brought by Mr. Don's brother, who had resided there for some time. So fine a collection of Roses exists no where else; the celebrated Mr. Sabine, who is secretary to the Society, having been engaged in studying this tribe for almost thirty years. They are arranged in large squares; one might almost say, in small groves of roses, native and foreign, single and double. On comparing this garden with those of the ancient universities of Cambridge and Oxford, one cannot for a moment hesitate in declaring the superior influence that this must have in benefiting the country; although it has only been formed within these few years, by the joint exertions of a few private individuals. The friend of mankind contemplates with pleasure how much more a well-directed Society of spirited men can effect in ten or twelve years, with the small sum of about 60,000 florins, raised among themselves, than has been performed by the two great learned bodies of the kingdom, with their millions. Whoever doubts the influence which the Horticultural Society has produced on the nation, or who thinks that our ideas of its value are over-rated, we would advise him to attend one of their sittings, and there to see what is done by the members of this institution; and then, like that *wisest* of the Apostles, Thomas, when he shall have weighed in his hand what is sent thither, when he shall have tasted of the fruit, and inhaled the rich perfume diffused by pines, peaches and nectarines, he will perhaps satisfy himself that it is not all a phantasmagoria. We had the honour of being present at a meeting of the Society in September 1824, and we must confess that although conversant with the rearing of fruit for almost forty years, we had never beheld finer peaches, nectarines, plums, melons, grapes and pine-apples, than we saw here. We had been much disappointed in the London fruit-markets, where we certainly saw uncommonly fine-looking fruit; but on tasting, found them to be acid or insipid, compared with the produce of our southern hemisphere, in Tyrol, the South of France, and Lower Hungary:

but after having enjoyed the flavour of the fruit here presented to us, it was easier for us to abandon our prejudices against this kind of English produce, than to conceive how so northern and foggy a climate could have brought to perfection such rich fruit; how Art has thus overcome the omnipotence of Nature.

The Horticultural Society possesses a very valuable pomological and botanical library, with a beautiful collection of models in wax of fruits, and two volumes of drawings made in China of native plants. The well-known Mr. Lindley, to whose kindness we owed our admission to the Society's collections, superintends here the botanical business of this establishment, and resides therefore at Turnham Green. Mr. Lindley is also engaged in several botanical publications, among which is the *Botanical Register*, in which he executes the work of Mr. Bellender Ker, alias Mr. Gawler, whose very bad health has compelled him to reside for some time at Boulogne.

In the same district with the two just-mentioned gardens,—namely at Chelsea, south-west of London,—is the celebrated *Hortus Chelseanus*, at one time under the direction of Miller, and particularly designed for the culture of officinal plants. Mr. Don was so obliging as to introduce us to the present curator, Mr. Anderson, a very amiable, open-hearted old man, who received us with Scottish kindness. Sloane's statue ornaments this garden, which possessing neither great size nor beauty, and still less elegance, yet includes, among the six thousand plants there cultivated, many very rare officinal vegetables, some which are to be found nowhere else. He who would here study botany has a rich field open to him, its value enhanced by Mr. Anderson's experienced remarks. There are standing in this garden, like twin brothers, two noble cedars planted by Miller's own hand; a *Pistacia Lentiscus* growing against a wall, and which he had raised from seed; and a *Platanus*, whose growth has made an increase of sixteen feet in circumference since the time of Miller. I saw here all the three species of *Platanus*, and was surprised at hearing that the Occidental Plane does not thrive well in the mild climate of England, as it shoots too early in the spring, and then suffers severely from the late frosts. I observed also *Sambucus nigra*, "foliis ternatis," which grows wild on the ruins of an old Roman wall in Wiltshire, but without perfect stamens, which it equally wants in the Chelsea

Garden. Among the Succulents, particularly the *Aloes,* are many that were in the possession of Miller. Banks has also left here a memento of his youth, in the invention of an experiment that will outlive him, much as its success was doubted at first. Mr. Anderson confirms it, by saying that when a tree or shrub is inoculated with a variegated-leafed variety, the foliage of the grafted stem becomes also gradually variegated. He showed us a proof of it in a Jasmine, which was only budded with a variegated jasmine, and now covers a whole wall with its particoloured leaves. It is a question, whether this variegation may not be produced in the same way by inoculating variegated buds on any tree favourable to the development of the buds.

Besides a small botanical library, existing at the time of Miller, the herbariums of Catesby, Rand and Nicholls, are also preserved here in well-closed cases : they appear, however, to be but little used, for we found the top papers so covered with coal soot as to blacken our hands. It is sad to see how the coal smoke penetrates every where. There is a collection of seeds by the venerable Rand, whose beautiful arrangement may have suggested the leading idea of the work by the two Gærtners. The Chelsea Garden is continually receiving seeds from all parts of the world : a large collection, sent by Baron Field, who is a Judge there, from New Holland, had just arrived. The liberal Mr. Anderson kindly offered us a portion of this valuable present, which we have divided again with other friends. Mr. Anderson related to us, not without painful feelings of just indignation, the history of the latter days of the immortal Miller. This zealous officer was dismissed in the most illiberal manner by one of the committee who then superintended the Garden, as a reward for his unremitting services to the institution, as well as his extensive knowledge in gardening. He soon after died of grief, and left—nothing ! Fifteen gardeners united, and subscribed a guinea each for a gravestone ; but as just at that time the son of Miller returned from India with a fortune of 15,000*l.*, and it being naturally supposed that the opulent son would erect a monument to his parent, the simple stone was given up :—yet the son never thought of rearing a monument to his illustrious father. Sir Joseph Banks then set on foot a new subscription, to which he himself contributed five pounds ; and the opulent nur-

serymen and others soon raised a considerable sum: nevertheless this plan came to nothing, as the son was thereby offended. However, the young Miller died soon after, and had a monument erected for himself and his father together.

We also visited the garden of the cheerful Haworth, at Queen's Elms, near Chelsea, who indefatigably and exclusively studies the Succulent Plants, and possesses many extremely rare ones. More than 200 Aloes, 360 Mesembryanthema, and 90 Crassulæ, are in his collection. Mr. Haworth seems a very communicative and kind-hearted little man: he has the happiness already of being a grandfather, though in the prime of his age. We had wished to see the respectable Mr. Salisbury's garden; but were told that he had sold it, and was living with a friend in the country during the fine weather. We were sorry to lose the opportunity of being acquainted with this celebrated botanist. Fortunately, we had the pleasure of seeing in London the Nestor of the London botanists, who has already passed the eightieth degree of human latitude,—namely, the celebrated Dr. Sims, whom we found indefatigably employed in the continuation of the *Botanical Magazine*, although with a trembling hand, and a head bowing down under the ponderous weight of the reverend silver crown of age.

A no less venerable and highly amiable sage is the good old man of the mountains, (*e monte Grampio,*) Sir Archibald Menzies, of the Grampians, among which he was born, at Chapel Place, in the month of March 1754. (!) Flora has presented this valuable old man with a truly *viridem senectutem,* in reward for the homage which he offered to her in his twice repeated voyage round the world. "And were another expedition going, I would immediately set off again," said Sir Archibald to us. He has lately returned from an excursion to Scotland; when his countrymen on taking leave of him threw the *Menziesia* *, accompanied with a thousand blessings, into

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* We must really beg leave to question the accuracy of this anecdote. We had the happiness of receiving Mr. Menzies at our house in his return from the Highlands, and heard nothing of this story of the *Menziesia*. Nor can Dr. Schultes be aware of the extreme rarity of this plant. Scarcely a single botanist has seen it on its native mountains, not even Mr. Menzies himself; so that we well believe that

the coach. He is now as active as a person of forty, and is in great practice as a surgeon in London. A neater herbarium than that of Sir A. Menzies I never saw: the Cyperaceæ and Gramineæ, as well as the Mosses and Ferns, (the latter are his favourites,) are laid out with the utmost care in octavo papers, and packed in cases, so as to be ready to be taken on board ship again at a moment's notice.

Sir Archibald Menzies informed us, with evident pleasure, that two of his countrymen (of Scotland) are about to enjoy the same privilege of travelling as his own youth had received;—a Mr. MacGray having been sent as a botanist, in that vessel which carried home the remains of the king of the Sandwich Islands, to the South Seas; and another, Mr. Douglas, being gone, in a similar capacity, to the Columbia River. A Mr. Frost, also, has visited America. From Menzies, too, we learned that Brodie, lieutenant of the County of Nairn and member of Parliament, has lately died.

At Mr. Lambert's Museum we had the great good fortune to become acquainted with Dr. Richardson, the celebrated companion of Capt. Franklin in his expedition to Arctic America. This gentleman, who lives at Chatham, was so obliging as to show us his herbarium, which contains many rarities, and a great number of new species, particularly belonging to the genera *Ranunculus, Rubus,* and *Potentilla.* Before starting on the voyage which he will undertake next year in the direction of the North Pole,—for not all the ice of those frozen regions has power to cool his ardour in the cause of science,—Dr. Richardson will prepare a new edition of his *Appendix.*

Mr. Andrews the botanist was not at home: he is proceeding with his works on the *Ericæ* and *Gerania.*

At the British Museum we had expected to find a treasure of Natural History; but,—except Sloane's collection of dried plants in thirty volumes, and an herbarium which belonged to a Mr. Van Moll, with a small but well preserved set of British birds,—we found nothing that interested us at all. The department of Minerals is

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if our venerable friend had been greeted with such a shower of his beautiful namesake, the day would have been one of the happiest of his life; and the freshly pulled specimens would have been at least as acceptable as the blessings which accompanied them.—Ed.

beautifully arranged by the celebrated German, Mr. König; but except some very rare unique specimens, it is inferior to the two collections at Paris, belonging to the Museum and the Ecole des Mines, as well as that of the Academy at Munich. Two tables that we saw here, covered with beautiful specimens of *Carpolitha*, would engage the attention of Count Sternberg for weeks; and he would be delighted to compare them with those treasures that he is himself so well acquainted with, and has so liberally communicated to the public. An immense building is in progress; with the addition of which the British Museum, now of inconsiderable size, will fill an entire square of the city of London. But to render this institution as rich in subjects of Natural History as it is in antiques, or as the Muséum d'Histoire Naturelle at Paris was, or as is the collection of Leyden in the department of the animal creation, would be the work of half a century. It is really incredible that a nation, possessed of the greatest conquests and making the most extended discoveries in all parts of the world, should have collected so scantily for its public Museum: and the more so, as England boasts of men of the most distinguished character in all branches of Natural History. How is it possible that the British can allow the two neighbouring nations whom they look down upon in many respects, to excel them in this way as much as they are outdone by them in others? This enigma would be to me perfectly inexplicable, if a solution to it were not afforded by the state of the two Universities of Oxford and Cambridge, where the science of Natural History is at so low an ebb.

Except the periodical works on Botany, and the Second Part of the publication on the genus *Pinus* by Count Lambert, we neither saw nor heard of any novelties in this department; except that we were informed that twenty sheets of Wallich's and Carey's *Flora Coromandeliana* had arrived in London. Mr. * * * * therefore was wrong, when he asserted with a haughty look three years ago, "A Second Part of this work will never appear!"

We have visited the celebrated flower-market of London; of which no German who has not seen it, could form a proper idea. What chiefly struck us is, that the greatest rarities and most trifling articles are here exposed for sale together, and that both are eagerly

bought. Were such things to be carried to the *Marché aux Fleurs* at Paris, not a pennyworth of them would be sold. But by the two flower-markets of these two principal cities of Europe, an estimate of the different character of their inhabitants may be formed. The wealthy and respectable Englishman, who is a connoisseur, will purchase nothing that is common; for if pretty, he has it already in his garden;—and the poor Londoner who cannot afford to buy what is beautiful, will still obtain, if possible, something green to decorate the window of his dark little attic *, and give his last farthing for a bit of verdure. The opulent Frenchman, who values all objects only as they please the eye, without reference to their being common or scarce, is willing to pay a greater price for a lovely rose-bush, than for the rarest plant from New Holland or the Cape of Good Hope; and as to the poor artizan of the French capital, he only thinks of vegetable productions as they are fit for culinary uses; and whether they be blue or green to look at, is the same to him. Hence it arises that the Parisian flower-market offers a much more delightful vista than that of London, though it is much smaller and more poorly stocked; as the French capital itself cannot compare with London for extent or wealth.

If the French pave the squares of their city that they may afford a more agreeable promenade, the English change theirs into delightful lawns, which afford a prospect of verdure to every house in the square. In the larger squares, these green plots are planted with groups of trees; and in the smaller ones with clumps of flowering bushes and shrubs, often interspersed with trees. By this arrangement, these quadrangles, and the houses which surround them, have quite a rural and romantic appearance. According to the capabilities of the situation, these plots are sometimes square, sometimes oval or circular; and they are railed in with a light tasteful palisade

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* Perhaps from the custom of the ancient Romans (for the English still retain traces of the manners of that people): "*jam in fenestris suis plebs urbana in imagine hortorum quotidiana oculis ruris præbebant, antequam præfigi prospectûs omnes coegit multitudinis innumeratæ sæva latrocinatio.*" Plin. Nat. Hist. xiv. cap. 4. By this "præfigi prospectûs" is not that most shameful of all imposts, the window-tax comprehended, by which the people are in a measure deprived of that most universal of all nature's gifts—*light*?

which does not injure the prospect. Where the streets are very wide, there is in front of every house a small garden, fenced in front, and generally containing a small green, and some tufts of elegant shrubs or beautiful flowering plants, which give to the whole street a cheerful, and to a certain degree a theatrical appearance. The houses themselves are often covered as high as the second story with *Jasmine, Roses* (particularly *Rosa semperflorens* and *Banksii*), with *Clematis, Corchorus japonicus, Bignonia radicans,* and the like, or entwined with them as a beautiful garland. *Camellias* (*?*), *Rhododendrons,* and *Dahlias,* usually form the clumps on the green places before the houses, which are no where seen in such perfection as in England; for the beauty of these verdant lawns, which extend in front of the dwellings like a green velvet carpet, has often attracted my attention; and I have inquired of several gardeners the names of the particular species of grass employed for this purpose. *Agrostis alba, verticillata,* and *stolonifera, Poa pratensis, Lolium perenne,* and *Festuca pratensis,* have all been indifferently named: almost every person has mentioned some other kind than has been recommended by my former informants; but all agree in this, that these grass plots require to be mown carefully every fortnight,—some say even every week,—with the scythe; in fact, to be close shaven. To the great frequency with which the grass is cut, the beauty of these lawns, or bowling-greens, seems to be chiefly owing: their fine preservation is also aided by the mild and equable climate of England, where the winters are never so severe as to check vegetation for any long period, nor the summers so scorching as to burn up the tender roots; while the frequent fogs and constantly damp state of the atmosphere morning and evening are highly favourable to verdure. Were the lawns in our country to be mown so often and so close, they would infallibly be soon burnt up. The opulent Englishman is so partial to a garden, that if his house should chance to have a northern exposure where not a ray of sun can reach, he will yet plant it with evergreen shrubs, as the *Ilex;* and with such flowers as are found capable of enduring such an aspect. It is the general taste that prevails for plants, to which the number of nursery-grounds, and the astonishingly active business that they carry on, are owing. The success of so many *marchands des plantes* continually encourages

their increase; and I am told that not a year passes without the establishment of some new institution of this kind. On the way to Hammersmith to see Kennedy and Lee's Nursery, we met the proprietors of two others, Gray and Sons, and Malcolm and Co. at Kensington. The house of Lee and Kennedy, so well known with us on the continent, has lately experienced great changes. Mr. Kennedy has withdrawn from the concern, and is gone to Amiens in France; and the old Lee died about two months ago. At present, the sons carry on the management of this large nursery, which they themselves say contains one hundred acres, and requires the labour of from one hundred and fifty to two hundred workmen. Although this estimate seems to me enormously large, yet thus much is certain, that it is one of the greatest nurseries in London, and carries on an extensive trade both at home and abroad. The more common kinds of plants seem to be chiefly cultivated here; although there are three hundred species of *Erica*, and half of every day is allotted to the management of *Camellias*. The stoves are of the usual kind; there is no pond for the convenient watering of the plants; nor have the proprietors published a new Catalogue.

Mr. Colville, on the road to Chelsea, certainly has the rarer kinds of plants in his collection. Messrs. Mackay and Co., Fraser, &c. have also gardens in this neighbourhood. We here became acquainted with Mr. Sweet, whose publications on the *Gerania* and *Hortus Suburbanus* are well known. Many unknown and rare vegetables from all parts of the world, particularly Nepaul, New Holland, and New Zealand, and the tolerably well explored Cape of Good Hope, exist in Mr. Colville's Nursery: but the establishment of this kind, which belongs to Mr. Conrad Loddiges, appeared to us the largest and finest in England. It would be hard to say whether its great extent, the beautiful productions with which it is stocked, or the judgement, taste, and liberality with which it is conducted, are most worthy of admiration. With regard to the latter point, we will venture to say, that much as we have travelled and seen, we have met with no stoves, belonging to prince, king, or emperor, which can compare with those of Messrs. Loddiges, at Hackney, for the magnificence, convenience and elegance of their plan, and the value of their contents. Let my reader imagine a dome, eighty

feet long and forty feet high, built in the form of a paraboloid, purely of glass, kept together by a delicate but strong frame of small iron ribs. This dome is heated by steam, when the rays of the sun are found insufficient to warm it. In ascending to the upper part of it by an elegant stage thirty feet high, we thence enjoy a scene entirely novel to a native of Europe: the tropical plants of both hemispheres, the eastern and the western, are stretched below at our feet; and the prospect is similar to what might be presented on a hill clothed with tropical verdure, through an opening in which we might look at the scenery beyond. A slight touch with one finger suffices to bring down from the light roof of this dome a fine shower of rain, which sprinkles all the exotic vegetation among which you walk. To this gentle and careful manner of watering the plants, (the nearest mode of imitating nature,) may be ascribed the rich luxuriance of the inmates of this stove. Besides this house, there are some twenty others, from one hundred and fifty to three hundred feet long, and greenhouses of various dimensions; all situated in two large gardens, containing about one hundred acres, divided by a wall, in which plantations are scattered. One of the houses, built after the newest plan with convex windows, is stocked with nearly four hundred kinds of Heath. I am spared the task of enumerating the rarities of this garden, by the 13th edition of its Catalogue, published in 1823; and the pretty work called the *Botanical Cabinet,* which appears regularly.—As we were walking in the garden, through ranges of *Camellia, Rhododendron, Azalea,* &c. accompanied by one of the sons of Mr. Loddiges, we took the liberty of asking him what might be the value of the plants in the whole collection, supposing that every one in the Catalogue were sold according to its price as there marked? "About 200,000*l.*" was the reply: that is, 2,800,000 florins. The cultivation of gardens cannot therefore be so paltry an occupation as some individuals at the University of Landshut would have us to believe, who, while they will spend 6000 florins in a beer cellar, yet allow the botanical garden there, which might serve as a nursery-ground for the whole country, to fall to decay in a manner as useless as it is mean; and this too, when the gardens of the other Universities of Germany have been lately doubled and trebled in extent. As President of the Botanical Gar-

den at Landshut, it becomes me thus publicly to declare this matter, in order that the disgrace which must accrue to the University, which is so far behind her German sisters, may not fall upon me, but on those who, contrary to the wishes of those wise promoters of good,—the Bavarian government,—have brought this stain upon Landshut, and whose names will be pronounced by posterity with the contempt they deserve. Let us only consider what a multitude of people are employed and maintained in London alone by these nurseries: not in labouring the ground and tending the plants only, but in making the millions of pots, of which the smallest costs a halfpenny (a groschen of our money); in manufacturing the immense quantity of glass which is used; in executing the smiths' and carpenters' work;—and it must then be readily confessed, that the improvement of a people has attained a high pitch, when the most pure, noble, and innocent kind of pleasure and taste, namely the enjoyment of the beauties of vegetation, has become a necessary; and thereby bestows food, clothing, and comfort on thousands of individuals, who must otherwise be a burthen to society. The nurserymen of London, from their great business, several of which annually return half a million, are obliged to have counting-houses of their own. Many of them keep travelling botanists in their pay, who from the most remote parts of the globe must send them seeds, roots, and living plants. In China, the East Indies, the Cape of Good Hope, at Sierra Leone, New Holland, New Zealand, Paraguay, Chili, Mexico, and the most northern parts of America and Siberia, many of these enterprising individuals have collectors; so that Geography is often improved by the trade of horticulture. How reprehensible therefore is the conduct of those who,—instead of promoting the culture of gardens and the love of plants, by which, according to the immortal Bacon, the mind and heart are alike improved,—endeavour to suppress and stifle all industry; and whilst they instruct youth in such detestable maxims, as that "sin alone is the road to God," (!) corrupt the rich and demoralize the poor. In Bavaria we have only one great person who possesses a garden that deserves the name (except that at Irlbach); and this nobler personage than Bavaria ever numbered among her *magnates*, is also the friend of that first ruler of Bavaria under whose happy government Botany and Horticulture began to

be known. Is it not mortifying to behold the nurserymen of England displaying more taste and wealth than our nobility? Perhaps I shall be answered, "It is only possible in England; only the natives of that opulent isle could do so!"—I beg pardon: Mr. Loddiges, the celebrated gardener and botanist, is no Englishman; he is—a German, a Hanoverian. In his youth he came over to this country as a gardener, possessing no other fortune than industry, talent and worth; and he is now an old man of eighty-six; a *millionnaire*, the father of many hundred English citizens (!), who for almost half a century have afforded to others the maintenance, without which they might have starved. He has the felicity of seeing two of his sons grown up, and very much like him; and grandsons who promise to be so too. His name will shine conspicuous in the annals of British Horticulture, and be pronounced with respect by all who honour virtue and good sense. The respectable old Loddiges strongly reminded both my son and myself of my immortal friend the late Bertuch of Weimar.

I have asked of many, I may say of very many Englishmen, why the great island in the west, called Ireland, is less known with respect to its botany, than Canada, Greenland, and Iceland. From all of whom I have received, instead of an answer, the remark, "That is a land of ——." Also I am assured that "it is safer to travel among savages than in the west coast of Ireland, where one is pestered by the Catholic clergy, and in momentary danger of being knocked down by the slaves." The exasperation of the English against the Irish is truly excessive, and can never be removed while so many causes of irritation remain. It appears to me that the blackguards must set the good neighbours together by the ears; and this *coursing*, as they say in England, will be kept up from the east and from the north-east with gold and silver "tam-tams" (?). There are two large islands in Europe, of whose Flora we are totally ignorant;—one is Sardinia, the other Ireland: both belong to the *Infallible* Church: had they belonged to the other, we had long ere now been furnished with a history of their vegetable productions; for all botanists have hitherto been members of the *Fallible* Church.

Since writing the above remark,—that Ireland and Sardinia are still *terræ prorsus incognitæ* in the European Flora,—I have received

a letter from the very excellent Balbis, of Lyons, in which he informs me that his friend and former student, the active Bertero, has received orders from the Royal Sardinian Government to explore, with a botanical view, that hitherto unknown island, and to compile a Flora of it. He will be provided with all necessary assistance at the public expense: and thus we shall become acquainted with the vegetation of Sardinia, as we are with that of Sicily and Corsica. Much may be expected from the energy and zeal of the indefatigable Bertero.

I can also give you a piece of botanical intelligence from Paris. The celebrated Baron Bory de St. Vincent will in the course of this year proceed to the Antilles; there to examine that favourite tribe, the *Ferns*, of which he already possesses a very complete collection. He expects to be able to elucidate all the points which Plumier left doubtful. From the well-known liberality of mind which this enlightened naturalist possesses, I should hope that it would be as agreeable to him as to our Germans who are partial to the Ferns, to have this information communicated in these pages; and, whether before or after his voyage has taken place, to see them thus placed in connection will confer much pleasure on—J. A. SCHULTES.

INFORMATION RESPECTING
THE GERMAN BOTANICAL SOCIETY,

Established for the purpose of sending Collectors to different Countries.

WE have already, in *Brewster's Edinburgh Journal of Science*, given a favourable account of this excellent Institution, and invited our countrymen to encourage it. To that work therefore we may refer, (vol. vii. p. 23.) for a history of the foundation and object of this establishment. In London, Mr. Christy, of Gracechurch-street, and Mr. Hunnemann, Queen-street, Soho, have taken a warm interest in its behalf; and through the medium of the latter gentleman a considerable amount of subscriptions has been transmitted. We are desirous of giving still more publicity to the undertaking, confident as we are that it must tend materially to increase our knowledge of the vegetable productions of the globe; but feel that we cannot do it better than in the words of a circular letter which has been translated

from the German, and kindly communicated to us by our liberal friend, and the friend of science at large, Mr. Hunnemann; and which letter contains the latest information on the subject. We shall merely add, that we are daily, and almost hourly, in expectation of the arrival of our share of the collections, for 1827.

Preliminary Notice.

To the Members of the Travelling Union for promoting Natural History; and an Invitation to Botanists as well as Mineralogists, to contribute their Subscriptions for 1828.

About the middle of this month the copious and valuable collection of objects of Natural History, particularly in reference to Botany, made by Mr. Fleischer, during his travels in the Levant, chiefly in the vicinity of Smyrna, and from whence he has just returned, has arrived in safety; and also the first part of a similar collection, made during last summer in the island of Sardinia, by Mr. Müller, another of the travellers.

Besides a great variety of seeds and other objects of natural history, there are now lying ready for distribution to the subscribers of 1827, about 40,000 specimens of plants from these countries, hitherto but little visited by naturalists. But the Union consisting at present of 116 members, by whom 145 shares have been subscribed for, the arrangement of the shares will require so much time, as to prevent the distribution from taking place till the month of March, 1828. However, we may venture to anticipate that every member will feel fully satisfied with the result of this year's travels,—from two to three hundred perfect and well-dried specimens of plants from those distant countries; and for such of the individuals as have subscribed for other objects, a corresponding variety of insects, seeds, &c. constitutes an ample dividend for every single subscription of 15 florins (30 shillings sterling).

In soliciting all the members of the Union to transmit their subscriptions as early as circumstances will permit, in order to afford greater scope to the further enterprizes of the Union, we beg leave to present here a more detailed statement of the plans intended to be pursued for 1828, viz.:—

1. Mr. Müller, who remains in Sardinia, will continue to make collections there; and his increased acquaintance with the nature of the country is likely to render his researches more and more successful.

2. Some friends of the Union will collect for its members the Flora of the Southern parts of Africa, at the Cape: a portion of which collection, intended for the year 1828, containing from six

to seven thousand specimens, is already in our possession; so that such members as send in their subscriptions early enough, may, if they desire it, receive a dividend of Cape specimens for 1828 to be added to their shares for 1827.

3. Two travellers, both of them students of pharmacy, will be sent to Norway, and are to depart in April next. One of them has been preparing himself for some years for a journey in pursuit of objects of natural history in that country; he is likewise well acquainted with the Northern Flora, and an ardent Muscologist: the other, possessing considerable mineralogical experience, will direct his attention chiefly to the collection of Norwegian fossils; but he is also no novice in botany, and well acquainted with Lichens and Algæ; for which reasons this journey is likely to promise a rich harvest of that tribe of plants.

Thus we may presume that this undertaking, which is to be extended into Lapland, will prove no less interesting than the Southern expeditions; since Norway has not, upon the whole, been much frequented for similar purposes. We therefore invite the assistance, for the year 1828, of all friends to botany, and also every mineralogist, who are desirous of obtaining in a safe manner and at a moderate premium the singular fossils of Norway,—a country so remarkable in a geognostic and oryctognostic point of view. The amount of a single subscription is 15 florins (30 shillings sterling). Mineralogists who desire to become members, are requested when they remit (postage paid) their subscriptions, to mention, at the same time, the average form or size of which they wish their specimens to be; and to state which specimens they desire especially to possess. The friends of botany who mean to become members for the year 1828, are in the same manner requested to express at the time of sending their subscriptions, whether they prefer receiving phænogamous or cryptogamous plants, or large kinds only; whether Sardinian or Norwegian plants are most desirable to them, or specimens indiscriminately from all the different countries; or lastly, whether there are any particular natural families of which they wish to have samples. The subscriptions are to be remitted either to the Central Institute of the Œconomical Society at Stuttgard, or to one or other of the undersigned, but always postage paid. For receiving their respective shares, the members have to pay nothing further, except the charges incurred for transmitting them from this place to their respective addresses; and it is left to their own option to point out the safest and least expensive channel by which they are to be sent.

(Signed) Professor HOCHSTETTER.
Dr. STEUDEL.

Esslingen in Wurtenberg, Dec. 20th, 1827.

LOCALITIES OF SOME RARE PLANTS,

Found by W. WILSON, *Esq. of Warrington, chiefly among the Breadalbane Mountains of Scotland, in the Summer of* 1827.

PERIODICAL works destined to communicate information upon any branch of science, besides possessing the advantage of distributing knowledge, have this still further recommendation, that they encourage its votaries to follow up the study more keenly, from the opportunities such works afford of preventing their discoveries from being lost to the world. In this respect the *English Botany* of the late Sir J. E. Smith,—whose loss we little thought we should so soon have to deplore, whilst transcribing for the press an article of the present Number, wherein his character is so highly and deservedly extolled by a learned foreigner,—the *English Botany*, we say, in this respect did an incalculable deal of good: so much so, that, during the course of its publication, *that* period may be reckoned the *golden æra* of British Botany. It is true that many contributors to that book, like its highly-gifted Author, are now numbered with the dead; and we fear that in acuteness at discriminating species, and industry in going in pursuit of them, there are some investigators, yet but few recently come forward, who will bear a comparison with a Dickson, a Goodenough, a Woodward, a Stackhouse, a Don, a Stuart, a Brodie: whilst the labours of many of the surviving friends of *British Botany* seem to have terminated with that publication. The spirit of Botany, however, still lives with them, and is now and then called forth by some interesting discovery; and we can also yet make mention of ardent admirers of the plants that belong to our happy islands,

> "Spreading o'er them wild and gay,
> Blessing Spring and Summer's day,"

and among which, these naturalists have detected—for let it not be supposed that our Flora is exhausted—some, which either from the circumstance of their novelty or their rarity deserve particular notice. Even in a county so near to the metropolis of the kingdom as Sussex, Mr. Borrer has discovered a most interesting addition, both as to species and genus, to the British Flora: the *Isnarda palustris*, which he found at Mayfield, in June 1827. The same gentleman has been so good as to communicate to us the *Phyteuma*

spicata, which was detected three years ago at Mayfield and Waldron, in the same rich botanical county, by Mrs. Price.

Our excellent friend the Rev. Mr. Henslow, Professor of Botany in the University of Cambridge, has been fortunate in meeting with many rare British plants; and one, that is quite new to the "English Flora;" and that too in such abundance that it seems surprising it should not yet have found a place in works descriptive of British Plants. I mean the *Althæa hirsuta.*

The last (and we regret to say the concluding) Numbers of the New Series * of *Flora Londinensis* contain two plants, which we little expected would be found in so southern a latitude as Ireland; *Papaver nudicaule,* and *Ledum palustre :* both of which the eminent Mineralogical Professor, Gieseckè of Dublin, detected there, in the north-west corner of the island. In the midland counties of England, Mr. Purton still zealously follows up the study of the Fungi: and Dr. Howitt has ascertained a new station for that most rare and curious of all Mosses, the *Schistostega pennata,* as mentioned in the second edition of the *Muscologia Britannica:* whilst Mr. Jowet has diligently explored the botanical riches of the environs of Nottingham, and has published an interesting account of them, in a series of letters signed *Il Rosario,* in the Nottingham Journal.

Scotland too, notwithstanding the numerous discoveries of Dickson and the elder Don, is still frequently rewarding her sons, as well as the stranger who visits her mountains, with some new productions; especially among the class *Cryptogamia.* Greville, Arnott, and Drummond have recently added largely to her Flora; but chiefly the late lamented Carmichael has enriched the catalogue with many species, which none but one gifted with his acute eye and his discriminating mind could have detected. Many of these novelties have appeared, either in the *Flora Scotica,* the *Flora Londinensis,* or the *Cryptogamic Flora* of Scotland by Dr. Greville †: the rest we trust will soon be described in the new edition of the *Flora Scotica,* which

* The New Series of the *Flora Londinensis* is now concluded, with 216 plates of, mostly, the rare plants of Britain: and the new edition of the Old Series is also completed in three volumes, with 432 plates.

† This gentleman, we are happy to learn, has made an arrangement with a bookseller for the publication of a work on the Marine *Algæ* of Britain.

will, by such powerful aid, constitute perhaps as complete a catalogue of vegetable productions as any country can boast. The alpine region of Clova, though so successfully investigated by Mr. Don, has yielded a great number of novelties to Mr. Drummond of Forfar. But these discoveries, interesting as they are to the British Naturalist, shrink into nothing in comparison with what he has brought home from the alpine regions of North America; and some account of these must form the subject of an article in this Journal.

There are botanists however, we cannot but believe, who are successfully pursuing their career, from the purest and most disinterested love of the science, alike "unknowing and unknown" as respects other botanists; believing perhaps that their discoveries, made under such disadvantageous circumstances, cannot be valuable to the more experienced labourer in the field. It was accident that made us acquainted with such an one, whose name stands at the head of this article. We had solicited permission to publish in the *Flora Londinensis* his important discovery of the *Cotoneaster vulgaris* * as a native of Britain, and had afterwards the pleasure of making an excursion into the Highlands of Scotland with him. We parted at Killin, where Mr. Wilson remained for some weeks, botanizing in the neighbouring mountains, which are known to be very rich in plants. The following observations are the result of these excursions. We give the list as it is; for though the species which compose it are not all of such rarity as to be particularly interesting to those who are in the habit of exploring alpine districts, yet there are few whose localities may not be acceptable to some collector; and they are stated with considerable minuteness and accuracy. The remarks, be it observed, are chiefly with reference to Sir J. E. Smith's *English Flora.*

Aspidium Lonchitis: particularly fine and abundant below Craig Calliach.

* This plant Mr. Wilson found in Wales, in which country and in the neighbouring border of England he has met with many interesting productions, not before known as existing in Britain: amongst them is *Bryum affine,* of Schwaegrichen, which was detected in a wood at Over, Cheshire, sparingly and in swampy ground, since the publication of the second edition of *Muscologia Britannica.*

Aspidium dilatatum: a small variety in the woods of Finlarig; on a detached rock, overgrown with moss: and a still smaller one on the rocks near the summit of Ben Lawers.

Woodsia hyperborea. Rocks below the summit of Mael Greadha, looking towards the east: and upon Ben Lawers.

Salix phylicifolia. Burn above Finlarig.

S. prunifolia. Craig Calliach.

S. reticulata. Ben Lawers. Very abundant upon Craig Calliach.

Carex atrata. Craig Calliach. Mael Greadha. Ben Lawers. July and August.

C. dioica: Monoecious variety, in Fion Glen; and on the north side of Craig Calliach. July.

C. pulla. Very abundant about the swampy (not boggy) sources of alpine rills, at the north side of Ben Cruachpen, frequently intermixed with *Juncus castaneus:* also plentiful in wet places between Ben Cruachpen and Mael Greadha; Ben Lawers; Mael Ghyrdy:—a perfectly alpine species. July, August.

C. axillaris. Burn near Auchmore, a small distance above Loch Tay.

C. capillaris. Craig Calliach. Ben Lawers; on moist declivities at the foot of projecting rocks. July, August.

Kobresia caricina: near the summit of Schroine ach Lochen; a mountain south of Mael Ghyrdy. August.

Listera cordata. Ben Lawers, at the upper end of the burn leading from Lawers Kirk to the Lake, below the summit, growing with *Cornus suecica.* July.

Hieracium alpinum. Mael Duncrosk (the mountain between Craig Calliach and Mael Ghyrdy): also on rocks to the east of the summit of Mael Ghyrdy. July.

Apargia Taraxaci. Craig Calliach, and other mountains near it: in moist situations near rivulets. August.

Serratula alpina. Craig Calliach. Schroine ach Lochen. August.

Gnaphalium supinum. Craig Calliach, Ben Lawers, &c. July.

Hypericum hirsutum. Finlarig Wood. August.

Arabis hirsuta. Finlarig Wood, and on rocks behind the Manse at Killin. July.

Draba hirta. Ben Lawers: confined to the very summit of the dif-

ferent ridges of the mountains, and found in drier situations than *D. incana* usually inhabits. July.

Melampyrum sylvaticum. Burn above Finlarig: very sparingly. August.

Dryas octopetala. Rather plentiful upon Craig Calliach. July.

Arbutus Uva-Ursi: usually found upon rocks and broken places in subalpine situations: upon Mael Ghyrdy it is plentiful upon the ground, intermixed with *Vaccinium Vitis-Idæa* and *V. Myrtillus.* May and June.

Cherleria sedoides. Ben Lawers, Mael Greadha. June, July.

Calyx one-leaved? yet deeply divided into five segments. Stamens from a glandular disk: those opposite to the segments have, on each side of their base, a yellow gland (not "on the inner side"); the other filaments are placed between these lateral glands, not at their back.

Arenaria verna. Mael Duncrosk: a very small distance from Craig Calliach; where, at nearly the same elevation, *A. rubella* occurs, and where *A. verna* is not found.

Filaments from a glandular disk; those alternate with the petals have at their *exterior bases* a single nectariferous pore.

A. rubella. Mael Greadha, very sparingly: rather plentiful on the east side of Craig Calliach, at a considerable distance below the summit of Ben Lawers, towards the south-west, in considerable plenty: it prefers the bare declivities at the foot of projecting rocks thinly covered with soil. July.

Anthers generally quite white. Nectary very similar to that of *Cherleria.* Styles 3, 4, or 5; frequently 4. Stem sometimes two-flowered, mostly single-flowered.

Sedum villosum. Ben Lawers, very sparingly, near the sources of rivulets halfway up the mountain. June.

Spergula saginoides. Craig Calliach, Ben Lawers, &c. not uncommon. July, August.

Vaccinium uliginosum. Craig Calliach, upon the rocks in wet situations: on Ben Lawers it is found with *V. Myrtillus,* halfway up the mountains. June.

Epilobium alsinifolium. On the east side of Mael Greadha, below the rocks; not observed elsewhere: *E. alpinum* very common. July.

—*Epilobium alsinifolium* alone is found in Wales; it has commonly been mistaken for *E. alpinum.*

Trientalis europæa. Ben Lawers, in open moist ground, amongst *Juncus squarrosus,* very dwarfish, and bearing only one flower. Coppice near Auchmore, in dry sunny situations, where the fruit is matured. June, July.

Tofieldia palustris: of common occurrence in swampy places near springs, at the middle region of the Breadalbane mountains. July. What is termed a calyx, appears to be only a trifid, lateral bractea. I think the corolla is monopetalous: if so, the filaments are attached to the segments. Germen solitary; the supposed capsules are only valves of one capsule, united in the germen to the summit: they separate at the furrows.

Luciola spicata: equally general on rocks, near the summits: sometimes found, like *Gnaphalium supinum,* at the side of burns, a considerable distance down the mountains; probably carried thither by the rains.

Juncus castaneus. Fion Glen; Mael Ghyrdy; and between Ben Cruachpen and Mael Greadha: although so plentiful in Fion Glen, on the north-west side of Ben Cruachpen, it is scarcely to be detected on the other side of that mountain. It is found only in very wet (not boggy) places at the sources of alpine rills. July. I have not observed it on Ben Lawers.

Leaves not "flat," but deeply channelled, and rounded at the back, with cellular partitions; not keeled: the channelled upper surface consists of a membranaceous skin. Angles of the capsule very blunt, and the sides convex.

J. biglumis: most plentiful on the north-west side of Mael Greadha. In Fion Glen it is often found growing with *Juncus castaneus* and *J. triglumis.* It occurs also on the south-east side of Ben Cruachpen; upon Ben Lawers; and Schroine ach Lochen; Mael Ghyrdy. June, July.

Leaves not flat but tubular, and slightly compressed, with distant, internal partitions. Capsule with three rounded prominences at the summit (hence very abrupt), and the style placed in the hollow thus formed. Stigmas longer and more slender than in *J. triglumis:* in this latter the leaves are setaceous, and as if suddenly

contracted from the top of the sheath; channelled, hollow, with distant, transverse partitions, and likewise with a longitudinal partition from back to front (hence the leaf appears to be doubly tubular). Flowers from two to five, on each stem: capsules tapering at the summit.

Juncus trifidus. Rocks to the east of the summit of Mael Ghyrdy: not observed any where else in that district. July.

Gentiana nivalis. Rocks below the summit of Ben Lawers, towards the south-west, very sparingly. August.

G. campestris: a white variety, very abundant in many situations near Killin.

Sibbaldia procumbens. Ben Lawers, Mael Greadha, Mael Ghyrdy. It prefers barren, somewhat moist declivities, where the soil barely covers the rock. July.

The stamens, as well as the pistills, vary greatly in number. More than ten of each are often found on the same flower. I cannot see how it differs from *Potentilla.* Herbage decidedly glaucous, but with a blackish tinge.

Cornus suecica. Ben Lawers, not far from the lake, growing with *Listera cordata.* July.

Poa glauca. Ben Lawers, Mael Ghyrdy, Schroine ach Lochen. July.

Sesleria cærulea. Very abundant on Craig Calliach; Mael Greadha, &c. June.

Melica nutans. Burn above Finlarig. June.

Festuca vivipara: with perfect flowers, near Auchmore, in dry grassy places: a very doubtful species. June.

Scirpus pauciflorus: abundant in swampy ground in the lower region of the Breadalbane mountains.

Veronica alpina. Craig Calliach. July.

V. saxatilis. Craig Calliach, Mael Duncrosk, Mael Greadha, Ben Lawers.

MUSCI, &c.

Bryum demissum. North-west side of Mael Greadha: fruit ripe in August.

Bartramia ithyphylla: very plentiful on the summit of the north-eastern ridge of Ben Lawers.

Gymnostomum curvirostrum. Burn at the foot of Mael Ghyrdy, in the ascent from Killin.

Bryum Zierii: plentiful with fruit, near the summit of Schroine ach Lochen. August.

Neckera pennata. Mael Duncrosk : upon the rocks, in holes. (This has only previously been found by Mr. Drummond in Forfarshire, and has been first published as British, in Greville's *Cryptogamic Flora of Scotland,* and in the second edition of *Muscologia Britannica.* H.)

Peltidea venosa : plentiful near the summit of Schroine ach Lochen, and very large ; also upon Ben Lawers, on rocks north-east of the summit, on the north-east or furthest ridge from Killin.

NATURAL HISTORY OF MADEIRA.

Our friend the Rev. R. T. Lowe, who is at this time visiting the Island of Madeira, on a Cambridge Travelling Bachelorship, is diligently engaged in exploring the different regions of that interesting spot, in search of its natural productions. In Botany we know that he has been very successful, from the excellent plants that he has communicated to us. Among them is a new Fern, of the genus *Cryptogramma**. It gives us much pleasure to know that he is collecting materials for a *Flora* and *Fauna* of Madeira: and from his acquirements, no less than from his industry, we can confidently say that this gentleman is eminently well qualified for the task.

SOME ACCOUNT OF THE SUBSTANCE COMMONLY KNOWN UNDER THE NAME OF *RICE PAPER.*

Although this substance is known to many persons as a very beautiful substitute for paper, and even preferable to it for making certain kinds of drawings and for manufacturing artificial flowers, it has generally, we believe, been considered as an article that has undergone some preparatory process; and, misled probably by its Eu-

* Cryptogramma Loveii.—*Icones Filicum,* p. v. t. 89. recently published.

ropean name, the idea has prevailed that it was composed of rice. Yet if this paper be held up between the eye and the light, an exquisitely beautiful cellular tissue is discoverable, such as no art of man could produce or imitate. It was then a subject of much gratification to us, that we were lately favoured by Dr. Livingstone with a specimen of the paper, inclosing a portion of the stem of the plant from which it is cut. The latter is evidently herbaceous; the piece is about four inches long, hollow in the centre, with a membranous transverse septum at each end, so that it appears to be the joint of a stem. The diameter is about an inch, and the thickness of the parenchymatous substance is little more than half an inch, but of the purest possible white. This piece might therefore be cut into a sheet or leaf, though only of four inches in length yet of considerable breadth; for it would of necessity be cut in such a manner as to unroll like a scroll of common paper.

It was Dr. Livingstone who first brought from China to Europe a quantity of this substance, which he presented about twenty-five years ago to Miss Jane Jack, who was celebrated for the beauty and accuracy of her artificial flowers. Formed of rice paper, they obtained additional celebrity, fetched very high prices, and were eagerly sought for by persons of the greatest rank and most acknowledged taste. For a bouquet which Miss Jack presented to the late Princess Charlotte of Wales, she received the regal present of 70*l.*

When Dr. Livingstone first procured the rice paper from the Chinese, the pieces did not exceed four inches square; they were dyed of various shades and colours, and cost about 6*d.* each square. Since that time the price has been much reduced, and the size of the pieces increased, so as to be upwards of a foot long and five inches across, and preserving their natural whiteness. The tinted pieces are employed by the Chinese for their artificial flowers, and the plain white for making drawings upon. Now, this material is so much esteemed in Europe, that it is in request with people of all nations who visit Canton.

The same substance being also known in our possessions at the East Indies, we wrote for information to General Hardwicke, a gentleman whose long residence in that country and whose ardent love of natural history gave him opportunities of becoming acquainted with

the nature and properties of the vegetable productions, such as few have enjoyed; and with that promptitude and kindness which ever mark his character, especially when he is engaged in furthering the cause of science, General Hardwicke immediately transmitted the following reply, which is extracted verbatim from his letter.

"I am very glad that it is in my power to answer your inquiries about the Plant which produces the substance known under the name of *Rice Paper*. It has very often interested me, and gratified my curiosity, to remark to how many useful purposes it is applied by the natives of India. You will find a drawing of the species which produces it in my volumes of Indian plants, among the *Papilionaceæ;* it is the *Æschynomene paludosa* of Roxburgh. It grows abundantly in the marshy plains of Bengal, and on the borders of Jeéls or extensive lakes, in every province between Calcutta and Hurdwar. The plant is perennial, of straggling low growth, and seldom exceeds a diameter of two inches and a half in the stem. It is brought to the Calcutta bazaars in great quantities in a green state; and the thickest stems are cut into laminæ, from which the natives form artificial flowers and various fancy ornaments to decorate their shrines at Hindoo festivals. The Indians make hats of rice paper, by cementing together as many leaves as will produce the requisite thickness: in this way any kind of shape may be formed; and when covered with silk or cloth, the hats are strong and inconceivably light. It is an article of great use to fishermen; it forms floats of the best description to their extensive nets. The slender stems of the plant are bundled into fascines about three feet long; and with one of these under his arm does every fisherman go out to his daily occupation. With his net on his shoulders, he proceeds to work without a boat, and stretches it in the deepest and most extensive lakes, supported with this buoyant faggot.

" You must observe that the cutting of this material into leaves, or laminæ, is not performed by transverse sections of the stem, but made vertically round the stem. The most perfect stems are selected for this purpose; but I believe few are found sufficiently free from knots to produce a cutting of more than nine or ten inches in length.

" You make use of the term *pith,* and call the laminæ 'simply the pith of the plant;' then you must consider the whole stalk of the plant as pith, for the bark is so thin and tender that you may scratch

it off with the thumb-nail. I have one of the lamina in my pocket-book measuring in length eight inches and three quarters, and transversely six inches and a half. The examination of this, even in an undressed state, completely identifies it with what is called *Rice Paper.*

" I must not forget to give you the native name of the plant, which in Bengālee is *Shola,* commonly pronounced *Sola.* Dr. Roxburgh considered the plant as annual, I believe. The foliage and other parts of the plant, where water is wanting, die down to the roots ; but where water is plentiful, the stems remain and branch out afresh in the proper season."

The volumes of drawings of Indian plants above alluded to, had been previously consigned to our use by General Hardwicke ; and they contain a complete figure of the plant, with flower, fruit, and a portion of that part of the stem which is thus employed for making *rice paper.* These will be engraved and published in the next Number of this Miscellany.

With regard to the species, however, the drawing in question is certainly the *Æschynomene paludosa* * of Roxburgh ; for it entirely agrees with his figure of that plant in the splendid series of unpublished drawings in the possession of the Honourable the East India Company, copies from which we have now by us. But there appears to be reason to think that is the same species with *Æschynomene lagenaria* † of Loureiro, which grows in Cochinchina. The characters entirely agree ; and Loureiro attributes to his plant, uses somewhat similar. " Caulis" he says " spongiosus et facile cedens, ac elastice resiliens commode aptatur ad obturandas lagenas, defectio suberis, quo regio illa caret." Again ; this species is, and in my opinion justly, united by DeCandolle at the suggestion of Dr. Wallich, with *Æschynomene aspera* of Linnæus ; which name we therefore prefer should be retained.

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* In the drawing and MS. Catalogue at the India House it is called *aquatica :* in the printed "*Hortus Benghalensis,*" *Æschynomene paludosa, Shola* and *Kath-Shola,* Benghalee.

† Hedysarum lagenaria, Roxb. Hort. Benghal. *Phool-Shola,* Benghālee.

FLORA OF THE BRITISH POSSESSIONS IN NORTH AMERICA.

Doctor Hooker is engaged in preparing for publication the entire collection of plants of British North America, which have been entrusted to him for that purpose by Captain Franklin and Dr. Richardson; and he has already completed many drawings of new species for the plates. This herbarium, alone, is extremely extensive, and the specimens are in the finest possible preservation. It includes collections made in three different portions of the country. 1. That of Captain Franklin and his officers, upon the coasts of the Arctic Seas, from the mouth of the Mackenzie river, westward towards Behring's Straits. 2. That of Dr. Richardson, principally obtained from the shores of the same sea, to the eastward of the Mackenzie river, and between it and the Copper-mine river; and comprising among many other rarities, probably the whole of the species which were unfortunately lost in the former expedition. And 3rdly, The portion collected by Mr. Drummond, the Assistant Naturalist; by far the most extensive, as may be supposed, of the three, since his whole time was devoted to forming collections, and in the most fertile part of the country;—that is to say, from the whole extent of the inland route of the Expedition, through Canada and the Hudson Bay Company's territories; and from that very interesting district, too, which Mr. Drummond alone was charged to visit; namely, the most elevated chain of the Rocky Mountains, a part of that vast ridge, extending in an almost uninterrupted line to the Andes of South America, and which no botanist had previously explored. This combined herbarium is so extensive that it, alone, would justify the preparation of a Flora of that vast region. But with these he has the opportunity of incorporating all the previous discoveries of the same travellers on the former overland expedition; of Captain Parry, and other arctic voyagers; together with the plants of Newfoundland and Labrador, gathered by Dr. Morrison, who afterwards fell a victim to his courage and love of science in exploring Central Africa; the botanical productions of Canada, which have been received from the Lady Dalhousie, Mrs. Percival, Mr. Sheppard, and Mr. Todd, &c.; those of North West America, gathered by Mr. Menzies and Dr. Scouler; together with herbaria which will be more particularly no-

ticed in the work itself. All these, too, Dr. Hooker is enabled to compare with a great number of the species of the United States, which he has received with their names from the authors of most of the Floras of that country, and which will serve to clear up many points which must otherwise have remained doubtful.

A considerable number of seeds have likewise been brought home by Captain Franklin and Dr. Richardson, and many have already vegetated; so that it may be expected that we shall soon have a number of these rarities flowering in our gardens; and, as may very well be conceived in a country not extending further south than lat. 42° (and this of an alpine character), such plants must be admirably suited to cultivation in the open air with us: which circumstance will give an additional interest to the Flora.

So large has been the collection in the Class *Cryptogamia,* that Mr. Drummond, Assistant Naturalist to the Expedition, has, in illustration of the above work, published, under the title of

"MUSCI AMERICANI,"

specimens of the Mosses which were gathered during the expedition. The number of distinct species, thus procured, exceeds two hundred and forty, which, with the well marked varieties, amount to two hundred and eighty-six kinds, to each being affixed its name, and references to species that have been already described, and descriptive characters of those which have proved to be new. The whole of the continent of North America has not been known to possess so many Mosses as Mr. Drummond has detected in this single journey. Scarcely any species of *Phascum* was before ascertained to exist in North America; here there are five, one of which has been hitherto undescribed, *P. subexsertum.* Among some of the most interesting species of other genera, we may mention *Gymnostomum phascoides, latifolium,* and *pumilum,* three new species; *Splachnum rubrum* and *luteum,* two of the finest and probably the most difficult to be obtained of any of the known Mosses. Upon the latter interesting ones, Mr. Drummond has made two remarks, which are at variance with the previously received opinions respecting them; namely, that the curious apophysis, which Hedwig and others considered to be umbraculiform, in a perfect state is glabrous and filled with a copious cellular tissue mixed with a fluid substance: and secondly, that notwith-

standing Wahlenberg's remark upon *S. luteum,* " tutissima ut etiam facillima differentia hujus et præcedenti speciei (*S. rubrum*), in colore umbraculi consistit," there are intermediate states as to colour and every other particular, which would warrant a botanist in uniting the two. So splendid, indeed, is this colour in the apophysis of the true *S. rubrum,* of Hedwig, that Wahlenberg further says of it, " adeo saturatissimus et elegantissimus, ut nihil in natura pulchrius esse queat." *Splachnum heterophyllum* and *intermedium* are new species. *S. arcticum* of Brown. *Systylium splachnoides* of Hornschuch; and *Tayloria splachnoides* of Hooker. *Conostomum boreale. Grimmia calyptrata* and *Hookeri* (nov. sp.). *Drummondia clavellata* Hook. (the *Gymnostomum prorepens* Hedw.) *Scouleria aquatica* Hook.; in the present work, *t.* 18. *Weissia turbinata,* allied to *W. splachnoides* and *macrocarpa* (n. sp.). *Dicranum julaceum, Richardsoni,* and *microcarpon* (n. sp.). *Didymodon oblongifolium* and *fragile* (n. sp.). *Tortula bryoides* and *suberecta* (n. sp.). *Neckera Menziesii* (n. sp.), but previously discovered in the north-west coast of America by the gentleman whose name it bears. *Hypnum vagans* and *pulchrum* (n. sp.). *Hypnum confervoides* Bridel. *H. obtusifolium* (n. sp.). *H. robustum* (*Hooker, Exot. Musc.*). *H. abietinum* (in fruit); and the variety called *scitum. H. erectum* (n. sp.). *H. neckeroides* (*Hooker, Musc. Exot.*). *Climacium americanum,* a very noble plant, quite distinct from *C. dendroides* of Europe, which is also in the collection. *Fontinalis capillacea. Bryum turgidum, triquetrum, demissum* (*Musc. Exot.*). *Cinclidium stygium. Timmia megapolitana. Arrhenopterum heterostichum,* and *Polytrichum angustatum,* Bridel, and *Hooker Musc. Exot. &c.*: together with many of the rarest species which have already been known to inhabit Europe or the United States of North America.

These Mosses are neatly arranged (the specimens being fastened upon each leaf of paper) in two 4to volumes, of the same size with the forthcoming *Fauna* of these regions by Dr. Richardson, and the general *Flora* by Dr. Hooker, and as the *Narrative of the Journey* by Captain Franklin, to which the Natural History portions may be considered as forming an Appendix. The whole will then constitute a very complete history, both as to geographical discoveries, scenery, inhabitants and productions, of an immense extent of country, which but a few years ago was considered as a " *terra prorsus incognita.*"

[TAB. XXVI.]

ON THE BOTANICAL CHARACTERS OF THE SUGAR CANE, WITH REMARKS ON ITS CULTIVATION. By JAMES MACFADYEN, M. D., Jamaica.

SACCHARUM OFFICINARUM,

(*Sugar Cane.*)

TRIANDRIA DIGYNIA. Nat. Ord. GRAMINEÆ.

GEN. CHAR. *Spiculæ* geminæ, altera sessilis, altera pedicellata, omnes hermaphroditæ, uniflorae, (biflorae,* *Br.*) *Gluma* duæ, coriaceæ. *Flos* hermaphroditus: *Paleæ* duæ hyalinæ, inferior mutica aut aristata, *Br.*) *Palea* (flos neuter univalvis, *Br.*) unica, mutica. *Kunth.*

Saccharum officinarum; panicula effusa, ramis numerosissimis verticillatis, glumis subæqualibus lanugine brevioribus, foliis planis glabris. (TAB. XXVI.)

Saccharum officinarum. *Linn. Sp. Pl. p.* 79. *Willd. Sp. Pl. v.* 1. *p.* 381. *Humb. et Kunth Nov. Gen. v.* 1. *p.* 146. *Spreng. Syst. Veget. v.* 1. *p.* 281.

Arundo saccharifera. *Sloane Jam. v.* 1. *p.* 108. *t.* 66. *Rumph. Herb. Amb. v.* 1. *p.* 186. *t.* 74. *f.* 1.

HAB. In India orientali? Colitur fere ubique inter tropicos.

This precious plant, so especially valuable in a commercial point of view, is supposed to be a native of the East Indies. The Chinese date the cultivation of the Sugar Cane to periods of the most remote antiquity: but Dr. Roxburgh ascertained that the Sugar Cane of China was different from *S. officinarum*, and he has published it as the *S. sinense*. From the East Indies it was carried by merchants, towards the

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* "Spiculas bifloras esse vix dubito, quamquam in speciminibus siccis eas despicere non potui."—*Kunth.*

close of the thirteenth century, to Arabia, whence the cultivation of it soon extended to Nubia, Egypt, and Æthiopia. The Moors introduced it into Spain. The Spaniards conveyed it to the Canaries in the beginning of the fifteenth century. From the Canaries it was imported to St. Domingo, and now forms one of the staple articles of trade of the whole of the West India Islands. An account of its botanical characters, then, and of the mode of its cultivation in the most extensive of our Islands in the West Indies, cannot but be acceptable to our readers: and this I am enabled to offer through the kindness of Dr. Macfadyen of Jamaica, who has lately sent to me, from that Island, the following Memoir on the Botanical Characters of the Sugar Cane, with Remarks on its Cultivation.—*Hook.*

It must be a subject of regret, that no direct intercourse exists between the British settlements in the East, and the West Indian colonies. While allied in their climate, and with the character of their labouring classes not very dissimilar, having also nearly the same objects of cultivation, the one knows nothing of the methods pursued and the processes employed by the other. There cannot be a doubt, but that, were the communication more easy, they might, with advantage, be mutually enlightened. We, in these islands, might learn a lesson from our Eastern rivals, who, for ages—long before a native of civilized Europe stepped on these shores—were occupied in the cultivation of the Cane, the Coffee, and many other productions, which now constitute the sources of our wealth. Perhaps we, in return, might suggest some improvement. It is with this view that I engage in my present task, trusting that some information may be given, in return, by some one conversant with the state of agriculture in the East.

Soon after my arrival in this island, I was led to make some observations on the botanical characters of the common Sugar Cane. Having found them to differ from any account I have as yet met with, I was tempted to draw out the following description.

Descriptio. *Radix*, culmi crassitie, perennis, solida, articulata, supra unamquamque articulam fibrillis numerosis secedentibus.

Culmi plures ex una radice, usque ad 12, vel ultra, pedum altitudinem adsurgentes, erecti, teretes, lævi, foliosi, articulati, supra unamquamque articulam punctis viridibus in 3 ordinibus notati. *Gemmæ* distiche alternantes.

Folia 3 pedalia et ultra, et 3 pollices lata, erecto-patentia, lineari-lanceolata, nervo costali incrassato, ante apicem evanescente, margine serrulato-aspera, prope basin ciliata, pilis albis strictis. *Vaginæ* pedales, striatæ, farinosæ, pilis strictis facile abstersis munitæ, pubescentia nigra interspersis. *Ligula* sub-lunata, integra, folii marginem versus pilis longis strictis ciliata.

Panicula bipedalis, erecta, effusa. *Rachis* stricta, obtuse angulata carinataque, ad ramorum ortum leviter villosa, cætera hispidula. *Rami* utplurimum verticillati, (6, 7, 8 in uno verticillo,) pauci inter verticilla sparsi, "primo erecto-patentes, deinde patentes, alternatim ramosi, ramulis simplicibus, gracilibus, obsolete angulati, basi villosi, ad articulos leviter flexuosi. *Articuli* trilineares, basi attenuati, apice parum incrassati. *Flores* in utroque articulo, aut duo, quorum alter sessilis, alter pedicellatus, aut (raré) quatuor, quorum 2 sessiles et 2 lateraliter pedicellati." *

Calyx uniflorus, 3 glumis, basi pilis albis sericeis cinctus. *Glumæ* subæquales oblongo-lanceolatæ: extima leviter ciliata obsolete binervis: media, acuminata; nervo dorsali viridi carinata (carina apicem versus villosa) cum vestigiis 2-4 nervorum lateralium obsolete notata, subdiaphana, basi purpurascens, margine villoso-ciliata, glumam intimam arcte amplectens: *gluma* intima, prioribus paullum brevior, diaphana, punctis purpureo-fuscis notata, ovato-lanceolata, mutica, enervis, v. obsolete uninervis, glaberrima, apice ciliata.

Corolla (squamæ hypogynæ, *Br.*) minuta, 2 valvis: *valvulæ* hyalinæ; una (gluma intima calycis excepta) rotunda, ciliato-

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* Meyer. *Primitiæ floræ Essiquibonensis*, p. 67.

lacinulata; altera brevis, ovata, apice tenerrime prolongata, filiformi. "*Stamina* 3, antheris lineari-oblongis, ochroleucis; *Germen* ovatum; stylis 2; stigmatibus rubro-fuscis. *Semen* desideratur."

Such is the account which my own observations, together with those of Meyer and others, have enabled me to draw out. I have ventured to differ from those who have preceded me, in regarding the calyx as formed of 3 glumes. The description given by Mr. Brown is, "flowers all hermaphrodite; calyx 2 flowered, exterior floret neuter, interior hermaphrodite, 2 valved, minute, embraced by the neuter floret." To me it appears preferable, to consider the 3 outer as glumes, since they are similar in texture, appearance, and every other respect, and as they differ so materially from what the distinguished Botanist above cited and all others agree in denominating corolla—as constituting the outer floral covering, and the two minute pellucid hypogynous scales as alone entitled to the designation of corolla. I observe that Palisot de Beauvois, in his *Agrost. nov. p.* 7, considers what has been here styled the innermost calycine glume, as a one-valved corolla; and what has been set down as corolla, he has termed a nectary. This is certainly preferable to considering the calyx as 2 flowered.

We now come to make a few remarks on the cultivation of the Cane.

The original stock of Canes cultivated in these islands was probably brought from Spain. There cannot be a doubt, indeed, but that the Sugar Cane is not indigenous to any part of the New World. We are, it is true, informed by the early voyagers and travellers, that Canes were found growing wild on the banks of the Mississippi, and other rivers of continental America; and Labat mentions that the first French settlers met with them in Martinique, and some of the other islands. It is most probable that they mistook for them some other of the reedy grasses, such as the wild cane, (*Arundo sagittata*,) or some species of the genus Arundinaria—all of which are common on the banks of rivers in these latitudes, and all, by their appearance and manner of flowering, might

readily deceive an inexperienced eye. Besides, were the Sugar Cane a native, it would be difficult to account for its being at present found nowhere in a state of nature.

It is a peculiarity of the Cane in this climate, that it refuses to perfect its seed. Ever since its cultivation in this island, it has been raised from cuttings of the joints. By these innumerable subdivisions, it has been continued to the present time, retaining all the characters and peculiarities of the parent plant. There are, in reality, only a very few plants in the island—the Canes which cover our fields being strictly not distinct beings, but prolongations of a few individuals—their origin derived from the enlargement of one part removed by division from another. The case is different in the East. Here we can point out but a few varieties: there, along the banks of the Ganges, its native region, it perfects its seed,* and may be raised in this manner, presenting innumerable varieties, corresponding to what we observe in all plants produced in this manner—the offspring seldom presenting a strict similarity to its parent stock.

It may be remarked, that in all plants, the cultivation of which is carried on by any other method than that of seed, (whether by suckers, as the plantain or pine, or by divisions of the stem, as in the case before us,) there is a tendency, in the course of time, to dispense with the process necessary for perfecting the fruit. We observe Nature, as it were, wishing to spare herself an exertion which is no longer necessary. In barren worn-out soils, on the contrary, where the supply of nourishment is scanty, we find an attempt made in many vegetables to return to this natural process of propagation; the plant shedding its seed, which, carried to a distance, germinates under circumstances more favourable than those of the parent. Perhaps in such situations we may hope to discover the seed of the Cane perfected. We might also succeed in obtaining it, by removing suckers from the plant, so that

* Dr. Roxburgh, however, notwithstanding his long residence in the country of the Ganges, never saw the seed of the Sugar Cane.—*Ed.*

its energies may be concentrated in the process of fructification.

It is another disadvantage attending the propagation from cuttings, that the stock sooner or later degenerates. We have instances in the apple, the pear, and in most fruits in which recourse has been had to this artificial method of continuing a species. The Cane itself affords us a well marked example. The original sort, which has been cultivated since the discovery of the island, has gradually deteriorated, till it has become no longer worthy of cultivation. It is needless to ascribe this to diminished fertility, since in new land it still comes up stunted in its growth. In like manner, the kinds which have been more recently introduced, are gradually deteriorating, so that, if no new stocks are imported, we may expect the discovery to be made, that the most fertile island in the world is no longer capable of growing Canes to advantage.

It may be proper to notice here, the peculiarities of the different stocks or breeds of Cane now in cultivation in the West India Islands.

The oldest stock—that which has been cultivated ever since the discovery of these islands—is known by the name of the *Country Cane*. It is readily distinguished by its diminutive size, its stem spindling, the joints close to one another, and the leaves but little broader than those of some of the common grasses. At one time great returns were obtained from it, and the quality of the produce is described as having been superior to anything we can obtain from the varieties at present in favour—being white, hard, and sparkling. Now, however, it has been consigned to deserved disrepute—its growth indicating all the symptoms of a worn-out stock, its aspect being dwarf-like, its returns scanty, and it, alone, of all the different breeds, being liable to the attacks of insects. There are some planters, however, who still regret that it should be thrown out of cultivation; ascribing the diminished fertility of the soil, and the inferior character of the produce, to the recently imported stocks, by which it has been superseded. That such have little occasion for their

complaints, I need only mention, that though planted in rich newly opened land, it has never been observed to improve—the foliage having the same grass-like appearance, marked with ferruginous spots, and the stalk coming up stunted and spindling.

II. The *Ribbon Cane* is a variety which has of late been deservedly rejected by all good planters. Its introduction is recent. The foliage it bears is profuse, the stem strong, and the joints, which are distant, are marked with longitudinal stripes of purple and yellow. It is from this last peculiarity that it derives its distinctive appellation. Altogether, it bears the appearance of a plant possessed of strong vegetative powers, holding a middle rank, in regard to size of stem and its general appearance, to the two stocks which still remain to be noticed.

III. The *Bourbon Cane* was introduced into the French colonies by Bougainville from the Isle of France. It was afterwards brought into the British Islands by Captain Bligh. It surpasses all others in the thickness of its stem, which bulges out between the joints. The joints themselves are longer than in the Country Cane, but shorter than the Ribbon and the Violet. Its foliage also is less luxuriant, the leaves being of a light green, somewhat stiff and erecto-patent. The hairs around the base of the calyx are few, and shorter than in the other varieties; the glumes have a reddish tinge, the outermost very obscurely 2 nerved, the middle obsoletely 1 nerved, and the innermost almost nerveless. This variety is the richest in the sweet principle, and, where circumstances admit, is always cultivated in preference. It demands indeed a fertile soil. On a poor soil, on the contrary, it soon dies away, failing to reach even the 2d or 3d ratoons. Hence, whilst it is the favourite stock in the Parish of Vere, its cultivation has been found to injure, in many cases irreparably, the light, gravelly, and sandy loams of the Parish of St. Thomas in the East.

IV. The *Violet*, or, as it is called in the French Islands, the *Batavian Cane*, is more grown in the West than in the East Indies; the soil of the latter being so fertile as to

admit of the cultivation of more approved varieties. The stem of the Violet Cane is of a purple colour, varying in intensity according to the nature of the soil. Thus, in poor lands near the sea-shore, such as several cane-pieces of Pera and Leith-Hall, but lately reclaimed from a state of salt morass, Canes may be observed of a deep purple colour, known by the names of the Claret Cane, the Black, the Imperial, Mont-Blanc, &c. The colour of such, when cultivated in a more favourable situation, has been observed to assume a paler character. As for the foliage of the Violet Cane, it is broad and luxuriant, and of a dark green colour: the glumes of the *Calyx* are purplish, spotted with deeper purple spots; they are marked with prominent green nerves, the outermost glume having 2 of this description, with 2 marginal less distinct, the middle having a dorsal nerve keeled and villose, with the traces of 2 marginal nerves, and the innermost the same as in the last, with the exception that the dorsal nerve is not villose. In the Systema Vegetabilium of Roëmer and Schultes, this is set down as a distinct species, under the name of *S. violaceum.* The only character at all distinctive, is the outer valve of the corolla being 4 nerved—a peculiarity by no means warranting such a division.

ON THE CULTIVATION OF THE SUGAR CANE.

The Cane is a plant of a warm latitude, its growth being in proportion to the heat of the climate, and the fertility of the soil. It may be considered as the production of the highest effort of the powers of vegetation. In almost all other plants, it is only during the germination of the seed, the most active period of their lives, that the sweet principle is to be detected. In the Cane it is at all times to be found, and *that* in quantities surpassing what exists in all other plants put together.

It is on our plains that the Cane reaches all the perfection of which it is capable in these islands. Yet, even here, ac-

cording to report, its size and luxuriance are inferior to what it attains in Madagascar, the Isle of France, and the districts of the East, more immediately beneath the Equator. Like all gramineous plants, it delights in a rather moist climate. Where the rains, however, are excessive, a rank luxuriance is the consequence, unfavourable to the maturation of the plant; the juices it affords being watery and deficient in the saccharine principle, yielding on crystallization a dark coloured sugar. Thus, in few parts of the island does more rain fall than in the parish of Portland. To the eye, few spots can appear more beautiful than Golden-Vale—an almost perfectly level plain, covered with a luxuriant vegetation, encompassed by lofty mountains, clothed to their summits with forest trees, which condense the vapours conveyed over them by the prevalent easterly winds of the tropics. The sky, however, being almost constantly overcast, the stimulating influence of the sun's rays is too sparing to awaken the energies of the plant to a proper exercise of the secretive and assimilative functions, and the carbon and other materials taken up as nourishment suffer only a partial decomposition; and, whilst the greater part escapes unaltered by exudation and respiration, a portion only undergoes the chemical changes by which it is converted into the sweet or saccharine principle.

The Cane demands a fertile soil. We have an example of a soil of this description in the Parish of Vere, which, with all its disadvantages of climate, must ever rank, in proportion to its size, as the most productive sugar district in the island. On examination it will be found to contain all the ingredients set down by Sir H. Davy as necessary to constitute a fertile soil. It is composed of alluvial matter, mixed with clay and sand, together with calcareous matter washed down from the neighbouring hills. Plantain Garden River, on the other hand, which holds only a secondary rank as a sugar district, is composed principally of alluvial matter, mixed with clay and finely divided gravel; there being very little traces of lime. It ought not to be forgotten, in valuing cane land, that a fertile soil, such as that of Vere, possesses two advan-

tages of great importance in a warm climate. It is found to be more uniform in its temperature, parting slowly with its heat; and it also absorbs moisture more rapidly and retains it longer than any other soil not similarly constituted.

There is a tendency, even in the best soils, under a state of cultivation, to become deteriorated, rendering the aid of manure necessary. By reflecting on the accumulation of vegetable and animal matter, which for ages must have gone on undisturbed, it is easy to account for the amazing fertility of the lands of the New World on their first cultivation. It must be equally evident, that, after a time, this store of vegetable nourishment must have been diminished; the quantity of sugar, &c. annually exported not being compensated for by the articles imported, such as corn, tallow, oil, wool, skins, wine, silk, &c., together with the fish derived from the sea. There is no plant, indeed, in the cultivation of which manuring should be carried to a greater extent than in the Sugar Cane. Think of the immense load of vegetable matter drawn annually from our fields, formed of principles derived almost entirely from the soil, and your only wonder must be that any land should for so many years be capable of supporting such a demand on what may be called its capital. We can thus easily account for the diminished productiveness, and consequently the impaired value of Jamaica properties. On many, the system of management has been especially wasteful, there being, even in the present day, planters who are not ashamed to declare that manuring has been systematically avoided by them, as injurious to the soil. Can we wonder, after this, that, in such estates, the returns have fallen from 400 to 50 hhds.? and is it not to this source, rather than to the anti-colonial spirit which has been so generally displayed in England, that we ought in a great measure to ascribe the present depreciation of West India property?

I need scarcely say, that, although the practice followed is the reverse, manure ought in this, as in all the other departments of agriculture, to be used in a fresh state. It is true that when it is employed in a decomposed state, the effects it

produces are more apparent during the first year. After that, these disappear, leaving the soil in its former impoverished condition; requiring, to make adequate returns, a repetition of the application every succeeding year. Recent manure, on the contrary, is not limited in its benefits; the result of its application continuing to be discernible for a number of years. Nature herself, indeed, teaches us the advantages of this latter practice. When fermentation or putrefaction goes on above ground, gaseous effluvia, equally noxious as offensive, force us to bury them beneath the surface—there these very operations become salutary—the decomposing mass, by gradual changes, "is converted into forms of beauty and usefulness; the fœtid gas is rendered a constituent of the aroma of the flower, and what otherwise would have proved injurious to life, becomes nourishment to animals and to man." In a climate like this, the necessity of employing manure in an early stage is particularly urgent, the heat hurrying on the process of decomposition and soon dissipating the gaseous matters, whilst the heavy rains wash away all that is soluble, or might be of benefit to the soil.

There is a method practised in this country, by which all the benefits of the application of manure in a recent state, are obtained. The cattle are penned on the land which is about to be turned up, shifting them to another place as soon as we conceive our object gained. Where this system has been carried to a proper extent, we find not only the fertility of the soil prolonged, but, what is most rare in the agriculture of this country, the land has been so much improved, as to give, after years of cultivation, greater returns than it had been ever known to do.

Manure is usually applied only to the plant cane; so that, whilst the returns of the first years are from 2 to 3 or more hhds., the ratoons sink down to 1 or even less; nothing being done for the Canes, except keeping them, during the early months of their growth, free of weeds. A more commendable system is practised by others, who are in the habit of applying manure to the roots; hoeing it in so as to incor-

porate it with the soil. By this means, the returns are kept up, whilst the land requires to be less frequently turned, and a great expenditure of labour and money is saved to the proprietor.

We may here notice the reprehensible practice of those who delay the application of the manure till the plant has made some progress. In this manner a starved and puny shoot is produced, which, unless the soil be naturally rich, no after-manuring can restore to a vigorous condition. We have an illustration of this in animals, whose young, if denied the proper nourishment, never afterwards arrive at their proper size or strength.

As to mineral manures, but few planters take advantage of them. It would be out of place here to enter on a lengthened digression on this subject. It is enough to mention that great benefit might be derived from them, and to refer for information on the subject to the *Agricultural Chemistry* of Sir H. Davy.

We now proceed to other methods employed in the amelioration of land. It is one of the advantages of a restricted cane field, that a portion of the land may be allowed to lie in fallow. There can be no doubt that in a climate like this, a clean fallow must be injurious to the soil. Its bare surface is exposed to the powerful action of the sun; and consequently fermentation and the other processes preparatory to rendering soluble the nutritive matter in the soil must rapidly go on, and nourishment be produced when no vegetables are present to absorb it. A great waste must be the consequence; the carbon uniting with the oxygen of the atmosphere, and escaping under the form of carbonic acid gas, and the fluid matters assuming the gaseous form and becoming speedily dissipated.

Where the surface, on the contrary, is covered, an equally certain benefit may be expected. The land may be allowed to cover itself spontaneously with weeds, such as the various species of the *Convolvulus*, which soon spread over the surface, affording a dense shade, enriching the soil by their remains, and when the land is broken up, by their slow decomposition

below the surface, affording a supply of nourishment for successive years. A preferable method, practised by some, is to obtain other crops from the soil during the period of the fallow. Thus yams, sweet potatoes, arrow-root, or any other tuberous rooted plant may be cultivated and allowed to remain in the land, as is the practice of the farmers in England with beet. A late intelligent planter was in the habit of planting his fallow land with the pigeon pea, (*Cytisus Cajan.*) He thus obtained a wholesome food for his negroes; the decaying leaves served as manure; and the branches and stems answered the purposes of firewood.

That some respite is required by cane land cannot be denied. This is still more evident when we reflect that it is a gramineous plant—a class of vegetables which, above all others, produces exhaustion in land—no soil for a series of years is capable of supporting an uninterrupted succession of crops of the cultivated grasses. Hence the necessity of imitating the rotation of crops observed by the British farmer; otherwise we may apprehend the same consequences with which other countries have been visited, such as Northern Africa, and Asia Minor, where, by an unlimited exportation of corn, the most fertile regions of the earth have been converted into frightful and arid wastes.

The burning of lands is carried to a blameable extent in some parts of the island, it being a common practice of many planters to consume by fire the weeds and trash left on the previous cutting. Its effects are, to destroy an excess of vegetable matter, and to diminish the coherence of soils, and consequently render them less retentive of moisture. Burning is, of course, admissible in newly cleared lands, especially on the plains; the first Canes raised being so rich in vegetable matter as to yield a produce little differing from molasses. It is also of service to clayey or marly soils, which, from being stiff and damp, are thus rendered dry and powdery. But it is evident that it can serve no useful end when the land has been long in cultivation, especially if it be loose and gravelly. It is indeed a practice to be entirely reprehended, as a wasteful expenditure of the strength of the land, without

bestowing almost a single advantage in return. As for the ashes serving the purpose of manure, it is of too little value to warrant our resorting, for the sake of it alone, to this otherwise detrimental process.

Irrigation is extensively employed on some estates. Its most direct benefit is, that it affords a present supply of moisture. Where, however, the land has been kept for some time covered with water, the beneficial effects are more lasting; as the soil becomes so saturated with moisture as to afford sufficient nourishment, and prevent the bad effects which would otherwise be experienced during a continuance of dry weather. It also serves the purpose of manure; the water being impregnated with animal and vegetable matter, and, when the river flows through a calcareous country, with the carbonate of lime. We may add that it causes a more equable diffusion of nutritive principle through the soil, and at the same time regulates the temperature at the surface. The only objection is, that in certain districts it might endanger the health of the inhabitants in the vicinity.

We now come to consider the peculiar method of preparing the soil previously to entrusting it with the plant cane. In the common practice, parallel trenches are dug, little more than six inches in depth, and the same in breadth; a hard bank being left on each side on which the earth removed from the trench is raised. The defect of this system is, that only a slight depth of soil is brought into cultivation, whilst the hard ridge left on each side of the cane-hole must give a very limited space for the development of the roots, and consequently restrict the plant in its supply of nourishment.

A more commendable plan is followed by a few, who are in the habit, previously to digging the trenches or cane-holes, of turning up the whole of the land with the plough. If the cattle-penns are placed upon it, after the soil has been thus loosened, and the cane-holes are then dug with the hoe, we have a right to expect from the ground all the returns of which it is capable. Thus, a great saving of human labour would be effected, and we should also have the land better turned up, and in a fitter state for cultivation. Till this

method becomes general, our system of agriculture cannot be said to have made an approach to that at present followed in Great Britain.*

Having thus prepared the soil, the cuttings of the Cane are to be placed at the bottom of the furrow, and slightly covered with soil—the bank formed in digging the cane-hole being left undisturbed. As to the distance at which they ought to be planted, it ought to be considerable in wet parishes, in order that there may be free access of sun and breeze, without which the Cane will never properly ripen. It is true it would spring up with all the appearance of luxuriance; but the stem would remain green, and yield scantily a dark coloured sugar. In parishes, on the contrary, where rain but seldom falls, and where our object is to protect the soil from the scorching heat of the sun, it is allowable to plant more closely.

It has been a question with some, whether it be of importance to take our cuttings from any particular part of the stem of the Cane. The top is usually employed, being otherwise useless. We may, however, naturally ask, whether a part more rich in saccharine juices ought not to be preferred. Sugar, it is well known, is a necessary food of the young plant. During germination, the seed-lobes become sweet, as well as the stalk during the tillering of corn, the neighbourhood of the bud in the stem of the tree, and the potatoe about to shoot. Were we therefore to take a cutting from the centre of the stem, where the juices are richest, perhaps we might obtain a plant of a more vigorous growth.

It may still farther be remarked that we should take our cuttings from plants which are in a strong healthy condition. We have an illustration of this in the apple. The seeds of the golden pippin always come up with large leaves,

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* It may be here noticed, as a subject of surprise, that no one, so far as I am acquainted, has made an attempt at obtaining a race of heavy draught horses. Our breed of riding horses is equal to any other in the world. There can be no doubt of success, were the attempt made.

bearing fruit of a considerable size, differing among themselves, as well as from the parent stock to which they are inferior. They are, however, more perfect than plants obtained from the seed of a crab, which produces trees all of the same kind, and all bearing a sour diminutive fruit, resembling that of the parent stock. So also the seed of the *turpentine-tasted Mango* never grows up into an improved variety, whilst *that* of the cultivated sort, known here by the name of the No. XI., almost uniformly, in favourable situations, proves a *good* fruit. The reverse of this is practised in the choice of cuttings for the cultivation of the Cane; the most worthless part of the stem being employed, and that taken from the worst Canes on the property, the growth of some worn-out piece of land, which, being unable to produce Canes fit for sugar-making, is set aside for the purposes of a nursery. Perhaps it is to this practice that we ought partly to ascribe the deterioration of our Canes.

The plant having appeared above ground, the bank left in digging the cane-hole is returned and applied to the roots of the Cane. Little is done for some time, except weeding. As the Canes spring up, however, this operation is superseded; the weeds disappearing as the ground comes to be shaded. About this time trashing becomes necessary. This is performed by removing the lower leaves of the stem, or such as have begun to fade, and laying them along the rows. The superabundant suckers are at the same time removed. The benefits of trashing are, that the Cane is enabled to shoot out; and as, after attaining a certain height, it is apt to bend near the root and lodge, the bed of trash or dried leaves prevents its touching the ground where it would be apt to root, to the great injury of the quality of the sugar. The sun and air also are enabled to penetrate to their stems, without which they would never arrive at a proper state of maturation. The importance of these agents, especially the first, is proved by the influence which the solar light exercises in increasing the proportion of carbon in plants; those which grow in the shade having their juices watery, and their fibres little inflammable. As carbon, or charcoal, is one of the principal

constituents of sugar, we may readily see how a free exposure to the sun's rays favours the formation of it in the Cane.

We have to recollect, however, that we may carry the trashing too far, especially if the climate be dry, or the season of the year be such that no rains are to be expected. An object with us in such cases ought to be, to protect the soil from a too direct exposure to the sun's rays. Besides, by stripping the plant, we deprive it of one of its principal sources whence it has to draw a supply of moisture denied by the soil. For we know, that, by a beautiful arrangement in the economy of Nature, the hotter the weather is, the quantity of water in the state of vapour contained by the atmosphere, is in proportion increased. During the dry months of July and August, when the ground is parched up, apparently without a drop of moisture, the Cane, by the power of absorption in the leaves, draws in from the atmosphere around, as well as from the dews at night, a supply sufficient for the purposes of life.

On the south side of the island, where the seasons are more regular, so that a certain portion of the year can be calculated on as wet, and another as dry, it is usual to commence crop immediately after the autumnal rains, and terminate previously to the May seasons. On the north side, on the contrary, the north-east winds, which commence in November and prevail till the middle of April, are always accompanied with heavy rains. Hence, the islanders labour under the disadvantage of having no stated crop-time, but cut Canes whenever the weather promises fair. Besides, it is well known that saccharine and mucilaginous matter is most abundant in all plants, and more especially in the joints of the grasses, during winter; whence the superiority of fiorin, (Agrostis alba,) a jointed grass, over all others, as a winter fodder. The same is the case with the Cane during the cold season of the year—for we have a winter not the less severely felt by these, the delicate productions of tropical vegetation. We see its presence in the chilled aspect of Nature: our meadows are bare, the growth of every thing is checked, and Flora decks herself in a less gaudy attire. At this time the

flow of the sap receives a check; "the materials," to use the words of a philosopher, the ornament of our age, "dissolved in it by the heat are deposited upon the sides of the tubes, now diminished in diameter; and in consequence of this deposition, a store of nutritive matter is provided for the first wants of the plant in early spring." This holds correct in the Cane; the cold season being the period when it is richest in the saccharine principle, and when it can be cut to the greatest advantage.

The plant-cane requires from fourteen to sixteen months for its perfect maturation; the ratoon from ten to twelve. The plant requires the extra time to establish its roots in the ground. The plant-canes are generally reserved for the conclusion of crop, the ratoons being cut a month or six weeks earlier every succeeding year. Thus, the first ratoons of a plant which has been cut towards the end of May, ripen about the middle of April. The second ratoons come in at the beginning of March, and so on:—the ratoons according to their age coming in earlier every succeeding year. Hence planters commence crop with the oldest ratoons.

To meet this arrangement, the time of planting is suited. The spring plant is put in early in the year, that it may ripen towards the end of crop of the succeeding year. In many dry districts, however, where the soil is light, from the dry weather which usually prevails at this period of the year, they find a difficulty in establishing their field. They are therefore obliged to have recourse to a fall plant, taking advantage of the rains which occur during the autumn.

The arrowing of the Cane is a sign of its attaining its full growth. It takes place at the end of autumn, continuing to come out for several months. It is desirable that the Cane should be cut as early after this as possible. Were it, on the contrary, cut while the arrow was about to make its appearance, it would be found unfit for the purpose of sugar-making. I need scarcely add, that, as the Cane only flowers at one period of the year, it is merely those fields which at that period have made some approach to maturity, that come

into arrow. Thus, Canes which ripen in May are cut down without undergoing this process.

Having thus watched the plant in the field, we may now venture upon a few remarks * on the processes connected with the manufactory of sugar from the cane-juice.

The juice of the Cane, according to Proust, who had op-

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* As this Memoir of Dr. M'Fadyen was not intended to convey an account of the several processes employed in the production of sugar from the Cane, the following extract from Dr. Ure's System of Chemistry will give as satisfactory an idea on this subject as can be done in a few words:—" When the plant is ripe it is cut down and crushed between iron cylinders, placed perpendicularly, and moved by water or animal strength. The juice which flows out by this strong pressure is received into a shallow trough placed beneath the cylinder. This juice is called in the French sugar colonies *vesou;* and the Cane, after having undergone this pressure, is called *begasse.* The juice is more or less saccharine, according to the nature of the soil on which the Cane had grown, and the weather that has predominated during its growth. It is aqueous when the soil or the weather have been too humid; and in contrary circumstances, it is thick and glutinous.

" The juice of the Cane is conveyed into boilers, where it is boiled with wood, ashes, and lime. It is subjected to the same operation in three several boilers, care being taken to remove the scum as it rises. In this state it is called *syrup,* and is again boiled with lime and alum till it is sufficiently concentrated, when it is poured into a vessel called the *cooler.* In this vessel it is agitated with wooden stirrers, which breaks the crust as it forms on the surface. It is afterwards poured into casks to accelerate its cooling; and while it is still warm, it is conveyed into barrels, standing upright over a cistern, and pierced through their bottom with several holes stopped with cane. The syrup which is not condensed filters through these canes into the cistern beneath, and leaves the sugar in the state called *coarse sugar* or *Muscovado.* This sugar is yellow and fat, and is purified in the islands in the following manner:—The syrup is boiled and poured into conical earthen vessels, having a small perforation at the apex which is kept closed. Each cone reversed on its apex, is supported in another earthen vessel. The syrup is stirred together and then left to crystallize. At the end of fifteen or sixteen hours, the hole in the point of each cone is opened, that the impure syrup may run out. The base of those sugar loaves is then taken out, and the white pulverised sugar substituted in its stead; which being well pressed down, the whole is covered with clay moistened with water. This water filters through the mass, carrying the syrup with it which was mixed with the sugar, but which, by this management, flows into a pot substituted in the place of the first. This second fluid is called *fine syrup.* Care is taken to moisten and keep the clay to a proper degree of softness, as it becomes dry.

portunities of examining it in Spain, contains gluten, or green fecula, gum, extractive, malic acid, sulphate of lime, and sugar. The last exists in two states; the one capable of crystallizing, and the other known as molasses, found only in a liquid state. The former is obtained by evaporation; the latter is combined with vegetable matter, which, thickening by heat, prevents the crystallizing of the saccharine matter. It is from the proportion of vegetable matter being in excess, that the juice of Canes, raised in newly opened rich land, yield little else than a dark liquid mass. In dry parishes, on the contrary, and in old lands, where the plant is free from any rank luxuriance, the proportion of molasses is small, and almost the whole of the juices is capable, by evaporation, of being converted into crystallizable sugar. As illustrative of this, it may be noticed, that grapes, which in the south of Europe yield sugar, refuse to do it in the north, although to the taste they be equally sweet. Thus, maturation has the effect of dissolving the combination between the vegetable and saccharine principles; increasing the proportion of crystallizable sugar, by diminishing that of the molasses.

The sugar loaves are afterwards taken out and dried in a stove for ten days; after which they are pulverised, packed, and exported to Europe, where they are still farther purified."

It is not perhaps generally known that silex is produced by the stem and leaves of this plant in greater quantity than by almost any other. A large specimen of almost pure glass was sent to me from the Mauritius by Charles Telfair, Esq.: it was part of a mass many inches thick, which from time to time is formed and covers the bottom of the furnace where the Canes are burned. The specimen was accompanied by the following remarks in Mr. Telfair's letter:— "I send you a piece of the cinder or slag, which is produced by the combustion of the '*begasse*' of the Sugar Cane,—that is, the Cane after having passed through the mill by which the juice is entirely expressed. It is, in this state, the only fuel that we use for boiling our sugar. The fire is very fierce, and the ashes run into the stony silicious form this specimen exhibits. It would appear from this, that silex is produced in considerable quantity by the rind of the cane, and then is fused into glass by the alkali in the ashes, formed by combustion. The quantity of this glassy matter produced in our furnaces is considerable, and *more in proportion when the canes are raised in dry and hot soils,* than in the cooler and more humid quarters."—Ed.

To produce this separation is the great object of the sugar-boiler. This is partly done by the application of heat, the gluten coagulating and assuming the solid form, under the appearance of olive-green flakes, and rising to the surface as scum. It is also partly accomplished by some of the earths and the alkalies. In the present backward state of vegetable chemistry, in this respect, we cannot distinctly state their *modus operandi*. We know that vegetable extractive forms an insoluble compound with alkalies and the sulphate of alumina. They also unite with the gluten, of which green fecula is principally composed, forming with it a kind of soap, converting it into oil and ammonia. The union of this last substance with water is very slight, since, as has been just mentioned, it coagulates readily on the application of heat.

As for the acid which is said to be present in the cane-juice, it must, when the Canes have attained a full age, be very small in quantity. When, on the contrary, they are in a green state, or when they have been allowed to remain for some time in the cane-yard, or when the juice itself has been allowed to stand over, or the vessels for receiving it have not been properly cleaned—in all these cases there can be no doubt that an acid, most probably the acetic, is present. It is equally certain, that unless neutralised, it may prevent the proper crystallization of the sugar. That the proportion of it, however, must be very small in the juice of ripe Canes, recently expressed, may be proved by the circumstance that it crystallizes readily without the addition of any temper, or with the addition of salts, such as the sulphate of alumina, or of potass, which could have no effect in neutralising an acid.

Lime is the alkali most commonly employed. The proportion of it to the liquor varies with the richness of the liquor, less being required for the Bourbon than the Violet or Ribbon Canes—for a field which has been properly trashed and weeded, than for one which has grown up in rank luxuriance—for the produce of a dry, than for that of a wet season or parish. Where too little lime is used, the sugar

never granulates properly, and is apt to deliquesce: where, on the contrary, the proportion is too large, as gluten is soluble in the alkalies, the fecula is re-dissolved, and the colour of the produce suffers accordingly.*

Many employ the salts of soda and potass, (generally the sulphate.) The sugar obtained by the former is of light grain; that by the latter, small but hard. Some prefer a composition of equal parts of lime, sulphate of potass, and sulphate of alumina, the sugar obtained by it being of hard grain. There are other salts which might be employed, were it not that the taste of the sugar would suffer,—such as the muriate of ammonia, the muriate of potass, nitre, magnesia, as well as the infusion of nutgalls. I may mention in conclusion, that by many the liquor previous to being heated undergoes the process of tempering. This method goes by the name of cold tempering.

As for the alkaline substances employed in the process, it is deposited with the scum, or runs off with the molasses, as none can be detected in the crystallized sugar on analysis.

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* Might not the saccharometer be used with advantage in this case?

[TAB. XXVII.]

MONOCLEA CRISPATA.

CRYPTOGAMIA HEPATICÆ. Nat. Ord. HEPATICÆ.

GEN. CHAR. *Receptaculum* commune fructus nullum. *Capsula* pedunculo calyce longiori insidens, univalvis, hinc longitudinaliter dehiscens. *Semina, filamentaque spiralia* columellæ tenuissimæ affixa.

Monoclea *crispata;* densissime cæspitosa, frondibus dichotomis pinnatifidis valde crispatis proliferis, capsula lineari-oblonga apice bifida. (TAB. XXVII.)

HAB. In ramis arborum, Insulæ Sancti Vincentii. *Rev. L. Guilding.*

Frondes cæspitosæ, parvæ, virides, dichotome divisæ, costatæ, membranaceæ, minutæ reticulatæ, pinnatifidæ; lobis insigniter crispatis subrotundatis; in costam globuliferæ; *globulis* rotundatis, carnosis, sessilibus, demum proliferis; gemmis subcalyciformibus, angulatis, convexis, inflatis, marginibus involutis, cribrosis. *Calyx* cylindraceus, carnosus, vix duas lineas longus, apice hinc fissus. *Pedunculus* magis minusve e calyce exsertus, pallide viridescens. *Capsula* linearis, pallide fusca, hinc longitudinaliter dehiscens, apice fissa. *Columella* centralis, gracillima, filiformis, cui semina filamentaque spiralia, e duplice helice, affixæ. *Semina* (pro ratione plantæ) magna, sphærica, subrotundata, paululum angulata.

If it is agreeable, in the present very advanced state of our knowledge of Botany, to detect and describe a new genus of plants, it is doubly so to discover, at an after period, another individual of the same genus, which shall determine the correctness and the validity of the former one. Such is the case in the present instance. In Mr. Lambert's Herbarium, among those plants collected by the celebrated John Reynold Foster, during the voyage of Captain Cook,

was a very remarkable one, which in habit and general structure seemed to be intermediate between *Anthoceros* and *Jungermannia*, but possessing a capsule of only one valve: in other words, which opened on one side to permit the discharge of the seeds: and now I have the satisfaction of receiving from the Rev. Lansdown Guilding another species of the same genus, which he found growing on the branches of trees in the Island of St. Vincent.

Here, as in the genus *Jungermannia* and *Marchantia*, we find different bodies originating in the frond, which we can by no means compare with those of other plants, and destined perhaps to aid the still farther increase of this plant beyond what might be accomplished by the seeds or sporules. In some fronds I have observed attached to the nerve, or midrib, sphærical bodies, (fig. 2,): in others, it would appear as if these bodies had germinated whilst still attached to the frond, and become young plants: but then they are most curiously perforated, very much in the same way as the whole substance is found to be in *Fucus Agarum*, and quite unlike any thing we find in the parent frond.

A columella exists in the present species, and is remarkably slender; and probably I have overlooked a similar structure in the Monoclea Fosteri, figured at Tab. 174 of *Musci Exotici*. This brings the plant still nearer to *Anthoceros*, from which it will yet remain abundantly distinct in the single valve of the capsule, and in the presence of the spiral filament.

The plant grows in small tufts or patches, upon the branches of trees, after the manner of *Jungermannia furcata* in our own country.

Fig. 1, Tufts of *Monoclea crispata, natural size. Fig.* 2, Portion with gemmæ. *Fig.* 3, Single gemma. *Fig.* 4, Female plant. *Fig.* 5, Capsule. *Fig.* 6, Germinating gemma. *Fig.* 7, Portion of do.:—more or less *magnified.*

[TAB. XXVIII.]

SINAPIS FRUTESCENS.

TETRADYNAMIA SILIQUOSA. Nat. Ord. CRUCIFERÆ.

GEN. CHAR. *Siliqua* bivalvis (nunc biarticulata, articulo superiore evalvi.) *Cotyledones* conduplicatæ. *Calyx* patens. *Br.*

Sinapis *frutescens;* siliquis linearibus lævibus, foliis inferioribus oblongis dentatis, superioribus lanceolatis integris, caule glabro frutescente. (TAB. XXVIII.)

Sinapis frutescens. *Aiton Hort. Kew. v.* 3. *p.* 404. *ed.* 2. *v.* 4. *p.* 127. *Willd. Sp. Pl. v.* 3. *p.* 559. *De Cand. Syst. Veg. v.* 2. *p.* 623.

Hesperis diffusa. *Herb. Banks. Sprengel. Syst. Veg. v.* 2. *p.* 900.

HAB. In Madeira intra rupes prope Curral das Freiras. *Masson.* Rupibus in viam ad " *Sâo Vicenti,*" Madeiræ. *Rev. R. T. Lowe.*

Caules frutescentes, valde ramosi, cæspitosi, e rupibus pendentes, pedales ad bipedales, ramis junioribus præcipue foliosi. *Folia* sparsa, oblonga, rigida, acutiuscula, indisdincte nervosa, dentato-sinuata, basi integerrima, in petiolum breviusculum attenuata, *suprema* lineari-lanceolata, subintegerrima. *Rami* floriferi subdivisi fere nudi, graciles, demum valde elongati. *Flores* subcorymbosi. *Calyx* paululum patens, foliolis duobus basi saccatis. *Petala* flava (nunquam versicoloria, *Lowe,*) lamina obovata, ungue calycis longitudine. *Germen* teres, elongatum, in stylo breviusculo attenuatum. *Stigma* capitatum, bilobum. *Siliqua* linearis, teres, subtorulosa, stylo stigmateque bilobo terminata: valvis enervibus. *Semina* uniserialia, ovato-oblonga, fusca, limbata. *Cotyledones* incumbentes, conduplicatæ; *radicula* semi-immersa.

Sinapis frutescens seems hitherto to have been only known by the specimens gathered by Masson, and preserved in the Herbarium of the late Sir Joseph Banks, and from which the description in the Hortus Kewensis, as well as that in De Candolle's Systema, were taken. Last year, 1827, my friend the Rev. R. T. Lowe was so good as to send me excellent specimens from Madeira, gathered probably in the original station of Masson, "in rocks by the road to Sâo Vicenti from the Jardin on the Curral Bridge;" producing both flowers and fruit in July. The habit, Mr. Lowe observes, is different from other species of the genus *Sinapis;* and De Candolle has doubted if the cotyledons were conduplicate. They are, however, unquestionably so; and hence, as far as this character is concerned, it cannot accord with *Hesperis,* to which it had been referred in the Banksian MSS. But it differs from De Candolle's *Sinapis* in the capitate stigma, and from his and Brown's in the nearly erect calyx, which is bisaccate at the base. Still I can hardly persuade myself that the science would be benefitted by constituting a new genus on such slight grounds.

The species seems to be exceedingly rare. Mr. Lowe has met with only one plant. "It is decidedly shrubby, with long, weak, entangled branches, hanging down in a thick bushy tuft from the perpendicular side of a rock. The leaves are of a bright but pale green colour. The flower a rather pale yellow, (by no means changeable, as De Candolle suspects,) scentless, at least by day." *Lowe, in Lett.* 1827.

Fig. 1, Calyx and pistil. *Fig.* 2, Petal. *Fig.* 3, Siliqua. *Fig.* 4, Seed. *Fig.* 5, Embryo. *Fig.* 6, Embryo with the cotyledons and radicle opened to show their structure more distinctly:—*magnified.*

[TAB. XXIX.]

WEISSIA RETICULATA.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

Weissia *reticulata;* caule brevi ramoso, foliis imbricatis ovato-lanceolatis acutis concavis integerrimis laxissime reticulatis, nervo attingente, capsula obovato-pyriformi nutante, operculo parvo hæmispherico subumbonato. (TAB. XXIX.)

HAB. Prope Cape Town, ad promontorium Bonæ Spei. *D. Mund.*

Caules laxe cæspitosi, breves ramosi, præcipue, ut videtur, innovationibus. *Rami,* una cum foliis, teretes. *Folia* viridia, arcte imbricata, ovato-lanceolata, acuta, tenuimembranacea, reticulata, areolis oblongis magnis, integerrima, nervo satis valido ad apicem attingente instructa. *Perichætialia* minora, magis acuminata, rubro tincta. *Seta* terminalis, erecta, rubra. *Capsula* nutans, obovato-pyriformis, exapophysata, ore valde contracto. *Calyptram* non vidi. *Operculum* minutum, hemisphæricum, apice umbone minuta terminatum, basi ad oram capsulæ annulatum. *Peristomium* e dentibus 16, subulatis, indistincte articulatis, pallide rufo-fuscis, subhorizontalibus.

This I presume would be included in Bridel's new genus *Oreas,* being allied to the *Weissia Mielichoferiana* and *W. elongata,* which, together with a plant of a very different appearance indeed, (*Weissia martiana,*) constitute that genus. The habit of all these, with the exception of the last mentioned species, is similar to that of the *Brya;* and the genus *Ptychostomum,* with the same habit, and a very imperfect inner peristome, may be considered almost as a connecting link.

Fig. 1, Tuft of plant, *natural size.* *Fig.* 2, Single plant. *Fig.* 3, Leaf. *Fig.* 4, Perichætium, with one of its leaves. *Fig.* 5, Operculum. *Fig.* 6, View of the underside of do. with the numbers. *Fig.* 7, Peristome. *Fig.* 8, Teeth of the Peristome:—more or less *magnified.*

[TAB. XXX.]

GUILDINGIA PSIDIOIDES.

DECANDRIA MONOGYNIA. Nat. Ord. MEMECYLEÆ.

GEN. CHAR. Cal. undique clausus, demum irregulariter rumpens, infra insertionem staminum concavus, radiato-striatus. *Petala* 5, rotundata, breviter unguiculata, crispatula. *Antheræ* oblongæ, basi curvatæ, apice poris duobus debiscentes. Bacca infera, bilocularis. *Semina* plerumque duo in singulo loculo, pulpo nidulantia.

Guildingia psidioides. (TAB. XXX.)

HAB. In insula Martinicæ, et in hortis insulæ Sancti Vincentii culta. *Rev. L. Guilding.*

Arbor 15-20 pedalis, ramosissima, cortice viridi-fusca, glabra obtecta. *Folia* opposita, breviter petiolata, oblonga, 4-5 pollicaria, glaberrina, coriacea, integerrima, sublurida, basi apiceque acutiuscula, suboblique venosa. *Color* intense viridis, subtus pallidior. *Pedunculi* subunciales, simplices, axillares, fasciculati, fusci, bracteati, cum bracteis duabus oppositis supra medium ad articulum insertis. *Calyx* angulatus, coriaceus, irregulariter ab apicem usque ad medium rumpens. Pars inferior calycis subhæmispherica, superne concava, interne radiato-striata, inferne germini adherens. *Petala* 5, calyce inserta ad marginem tubi, alba, subrotundata, substriata, marginibus

pulcherrime crispata, apice submucronulata, basi breviter unguiculata. *Stamina* in marginem calycis tubi inserta, 5 petalis opposita, 5 alterna. *Filamenta* longiuscula, declinata. *Antheræ* majusculæ, oblongæ, lateraliter compressæ, intense flavæ, basi sensim curvatæ, apice poris duobus debiscentes. *Germen* basi calycis accretum. *Stylus* longus, filiformis, deorsum curvatum. *Stigma* truncatum. *Fructus: Bacca* globosa, magnitudine fructus *Psidii Cattleyani*, aurantiaca, glabra, bilocularis (fide Iconis Cl. Guilding,) apice sæpe perianthii vestigiis coronata. *Loculi* pulpo purpureo repleti et sæpissime dispermi, nunc monospermi. *Semina* fusca, ovalia, subangulata. *Albumen* nullum. *Radicula* ad hilum seminis versa.

The plants to which the subject of our present description is unquestionably very nearly allied, are the *Mouriri guianensis* of Aubl. (*Petaloma* of Sw.) and the *Petaloma myrtilloides* of Fl. Ind. Occ. They have all the habit, and, in a great measure, the fruit, too, of the *Myrtaceæ:* but with the number of stamens and the structure of anthers, of the greater number of *Melastomeæ*. From the *Petaloma* of Swartz, however, our plant differs remarkably in the structure of the calyx. In the state of the bud there is no appearance of sutures, indicating where the calyx will open, the whole bud having the appearance, upon a large scale, of the capsule of the genus *Phascum*, among mosses. The gradual enlargement and developement, however, of the Corolla, stamens and style within, cause it to burst, which it does in a most irregular manner, into two or three angular pieces. The petals, too, differ from *Petaloma*, inasmuch as they are very broad towards the extremity, and at the base contracted into a short claw.

For a splendid drawing of this plant, and a complete and satisfactory analysis of the parts of fructification, I am indebted to the Rev. Lansdown Guilding of St. Vincent, to whom I am anxious to dedicate the genus, in testimony of his great acquirements in Natural History, and of his having so successfully investigated the Botany of the island in which he resides.

Of that drawing, however, just mentioned, I can only introduce such portions as are suitable to the humble size of this Miscellany.

At St. Vincent this plant is only seen cultivated in the Botanic Garden, having been introduced from Martinique, where the fruit is regularly sold in the markets. Yet, at St. Vincent, no value is set upon it, owing to the very small quantity of sweet pulp which tenaciously adheres to the seeds. The outer portion of the fruit is even bad to the taste, whilst the seed itself has the flavour of the filbert. The flowers, which have a disagreeable smell, like that of bugs, are produced from February to June, and the fruit, which is abundantly eaten by worms and birds, is ripe in December and January.

Fig. 1, Portion of the stem, with the flowers in different states, of the *natural size.* *Fig.* 2, A young bud, do. *Fig.* 3, Portion of a flower, from which all the stamens and the petals, all but one, are removed. *Fig.* 4, Side view of an anther. *Fig.* 5, Back view of do. *Fig.* 6, Portion of the stem, with leaves and fruit. *Fig.* 7, Transverse section of the fruit, *natural size.* *Fig.* 8, Seed, do. *Fig.* 9, Section of seed, slightly magnified:—all, but *Figs.* 1, 2, 6, 7, and 8, more or less *magnified.*

[TAB. XXXI.]

PHASCUM TETRAGONUM.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN. CHAR. *Seta* terminalis. *Operculum* persistens. *Calyptra* dimidiata.

Phascum *tetragonum;* caule elato subramoso, foliis lato-lanceolatis integerrimis subpatentibus nervo valido attingente, seta exserta, capsula elliptica (matura exacte) tetragona. (Tab. XXXI.)

Hab. In terram prope Tiegerberg, ad Cap. Bonæ Spei. *D. Mund.*

Caules duas vel tres lineas longi, cæspitosi, subramosi, basi dense radicibus tomentosi, superne foliosi. *Folia* subpatentia, inferiora etiam recurva, lato-lanceolata, vel ovato-lanceolata, acuminata, subopaca, integerrima, nervo valido ad apicem attingente instructa: *perichætialia* reliquis longiora, angustiora. *Seta* terminalis, exserta. *Calyptra* subulata, hinc lateraliter fissa. *Capsula* immatura subtetragona indistincte striata, anguste elliptica, demum matura, exacte tetragona, angulis acutis, basi vix apophysata. *Columella* gracilis. *Semina* numerosissima.

I at first took this very interesting little African moss for the *Phascum splachnoides* of Hornschuch, (*Physidium* Bridel,) in Horæ Physicæ Berolinenses, but on comparing it with original specimens of the latter, I find it to be distinguished by the more elongated stems, very differently shaped and much longer leaves, and especially in the curious and distinctly quadrangular capsule. It must, however, rank near to that species in any system that takes into consideration the natural affinities, and I cannot see any sufficient reason for either the one or the other constituting a genus distinct from Phascum. Both, again, will come near to *Ph. bryoides.*

Fig. 1, Tuft of plant, *natural size.* *Figs.* 2, 3, Plants magnified. *Fig.* 4, Leaf. *Fig.* 5, Section of a capsule *magnified.*

[TAB. XXXII.]

DRABA ALYSSOIDES.

TETRADYNAMIA SILICULOSA. Nat. Ord. CRUCIFERÆ.

GEN. CHAR. *Silicula* integra, ovalis: valvis planis vel convexiusculis; loculis polyspermis. *Semina* immarginata: cotyledonibus accumbentibus. *Filamentæ* edentulæ. *Br.*

Draba *alyssoides*; caule fruticoso ramoso, ramis tomentosis, foliis sparsis sessilibus patentibus ovato-oblongis subserratis siliculisque ovato-lanceolatis tomentoso-hirsutis. (TAB. XXXII.)

Draba? alyssoides. *Humb. et Kunth Nov. Gen. et Sp. v.* 5. *p.* 61. *Kunth Syn. v.* 3. *p.* 139. *Spreng. Syst. Veg. v.* 2. *p.* 39. *De Cand. Syst. Veg. v.* 2. *p.* 355. *Prodr. v.* 1. *p.* 171.

HAB. In provincia Pastoensi, prope Zapayes, Guachucal et Quarchu, alt. 1500-1600 hexap. Fl. Decembri. *Humb.* In summitatem montis Pichincha Regno Quitensi, legit et communicavit *Prof. Gul. Jamieson.*

Caulis pedalis et ultra, fruticosus, teres, pubescens, inferne nudus, superne præcipue ramosus; ramis subtomentosis; apicem versus foliosus. *Folia* sparsa, patentia, superiora magis erecta: *omnia* sessilia, ovato-oblonga, margine hic illic serrata, acuta, tomentoso-hirsuta, pilis ramosis. *Flores* terminales, primum corymbosi, demum fructiferi, racemosi. *Pedicelli* tomentosi. *Calyx* tetraphyllus, foliolis ovalibus concavis, extus parce pilosis. *Corolla* alba. *Petala* obovato-unguiculata, integra. *Stamina* 4 longiora. *Pistillum: Germen* anguste-ovatum, compressum, planum, vix pubescens, apice in stylo longiusculo attenuatum. *Stigma* parvum, subcapitatum. *Silicula* ovato-lanceolata, pubescenti-hirsuta, stylo persistente terminata, bilocularis, bivalvis. *Semina* septem vel octo singulo loculo.

Communicated with some other very interesting plants from the Andes of South America, by Wm. Jamieson, Esq. Professor of Botany in the University of Quito. It is probably the largest species of Draba which exists, and forms a striking contrast with the *Draba verna* of our walls and hedge-banks, or the *D. hirta* of our mountains. It seems to agree with Humboldt and Kunth's *D. alyssoides* in almost every particular, except that the leaves are not generally erect, and the *siliculæ* are too much inclined to *lanceolate* to be called simply *ovate*. But if this be the same plant, we do not see why those authors should doubt it being a real Draba.

Fig. 1, Flower. *Fig.* 2, Pistil. *Fig.* 3, Silicula. *Fig.* 4, The same with one valve separating and showing the disposition of the seeds;—more or less *magnified*.

[TAB. XXXIII.]

PARMELIA ENTEROMORPHA.

CRYPTOGAMIA LICHENES. Nat. Ord. LICHENES.

GEN. CHAR. *Apothecia* scutelliformia, submembranacea, subtus a thallo formata, centro affixa, margine inflexa. *Thallus* foliaceus, coriaceo-membranaceus, plano-expansus, adpressus, orbiculatus stellatusque, lobatus vel multifido-laciniatus, subtus fibrillosus.

Parmelia *enteromorpha;* albo-virescens, thallo substellato laciniis lato-linearibus elongatis flexuosis repetitim ramosis inflatis subtus aterrimis, apotheciis infundibuliformibus, disco flavo-fusco. (TAB. XXXIII.)

Parmelia enteromorpha. *Ach. Lichen. Univ. p.* 494. *Ejusd. Syn. Lich. p.* 219.

Lichen intestinalis. *Smith. MSS.*

HAB. Arboribus, in plaga occidentali Americæ septentrionalis. *Menzies. Douglas. Scouler.*

Thallus suborbicularis, expansus, stellatim ramosus, laciniis compactis, flexuosis vix imbricatis dichotome divisis, ubique inflatis, fistulosis, apicibus liberis, obtusis. *Color* superne pallide albo-virescens, apicibus fuscescentibus, nunc minute nigro-punctatus, subtus aterrimus, nitidus, intus etiam niger. *Apothecia* magna, conspicua, fere 6 lineas lata, superne disco concava flavo-fusca, margine elevata, inflexa, demum lacerata, subtus in stipitem fistulosum attenuata, ita ut totum apothecium infundibuliforme.

This very singular species of *Parmelia* has hitherto only been described by Acharius from specimens gathered by Mr. Menzies, but destitute of fructification. I possess the plant, however, from Mr. Menzies and from Mr. Douglas and Dr. Scouler, abounding in apothecia, and am thus enabled to give a perfect figure, from which it will be seen how much it differs in its structure from all the other known lichens, having its ramifications everywhere hollow and inflated, the colour on the underside and within a deep and shining black, and the apothecia tapering down at their base into a hollowed stipes or stalk; thus making the fructifications infundibuliform.

Fig. 1, Portion of a lacinia; and *fig.* 2, Section of an apothecium:—*magnified.*

[TAB. XXXIV.]

POINCIANA GILLIESII.

DECANDRIA MONOGYNIA. LEGUMINOSÆ, *Div.* CÆSALPINEÆ. *DC.*

GEN. CHAR. *Calycis sepala* 5, inæqualia, basi in cupulam subpersistentem coalita, inferiore fornicato. *Petala* 5, stipitata, superiore difformi. *Stamina* 10, longissima, omnia fecunda, filamentis basi hirsutis. *Stylus* longissimus. *Legumen* plano-compressum, (submultiloculare, isthmis spongiosis, an semper?) *Semina* obovata, compressa, endopleura in aqua gelatinosa, cotyledonibus planis, plumula ovali. *DC.*

Poinciana *Gilliesii*; inermis, foliolis oblongis, calycibus glandulosis apicibus dentato-ciliatis, leguminibus acinaciformibus glandulosis unilocularibus exsuccis. (TAB. XXXIV.)

Cæsalpinia Gilliesii. *Wallich. MSS.*

HAB. Prope Rio Quarto et Rio Quinto, et apud La Punta de San Luis. Abundat circa Mendozam, Americæ meridionalis. Fl. Nov. et Dec. Fruct. Jan. *Gillies.*

Frutex pulcherrima, 4 ad 10 pedalem, valde ramosa, ramulis teretibus, substriatis. *Folia* bipinnata, pinnis subdecemjugis, brevibus, alternis; foliolis 8–10 jugis, oppositis, oblongis, brevissime petiolatis, obtusiusculis, glabris. *Flores* racemoso-corymbosi, pedunculo pedicellisque glanduloso-pubescentibus. *Calyx*, foliolis 4 superioribus subæqualibus, oblongis, inferiore majore, valde concavis, omnibus deciduis, obscure sulphureis, pubescenti-glandulosis, præcipue ad margines, ubi ad apicem dentato-ciliatis. *Petala* magna, sulphurea, basi unguiculata, obovata, superiore latiore, integerrima. *Stamina* decem, perigyna, libera, ante expansionem floris insigniter convoluta, demum longissime exserta. *Filamenta* basi ciliato-pilosa, dilatata,

rubra. *Antheræ* oblongæ, versatiles, pallide rubræ, biloculares. *Pollen* flavum. *Pistillum* longitudine staminum. *Germen* subpedicellatum, oblongum, compressum, glandulosum. *Stylus* filiformis, ruber, basi glandulosus. *Stigma* infundibuliforme, parvum. *Legumen* acinaciforme, compressum, glanduloso-villosum, bivalve: valvis coriaceis elastice dehiscentibus, demum spiraliter tortis. *Semina* 9 vel plura, compressa, nitida, griseo-fusca.

I owe much of the above description to Dr. Gillies* of Mendoza, who made notes upon the living plants, and obligingly communicated them with the specimens of this very beautiful shrub. The flowers are very much larger than those of any other of the tribe of *Cæsalpineæ*, with the exception of *Heterostemon* and the recently discovered *Poinciana Regia* (Bot. Mag.) of Madagascar, and their structure is such that I have hesitated whether to refer the plant to *Cæsalpinia* or *Poinciana*, having the capsule of the former, and the lengthened stamens and style of the latter. Sprengel has perhaps judged rightly in uniting the two genera. In the fringed extremities of the calyx it has some affinity with *Coulteria* of Humboldt, and in the size and general aspect of the flowers, as well as in the shape of the fruit, with *Heterostemon* of Desfontaines; but in this latter the stamens are united and unequal. *Mezoneurum* again has

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* Since Dr. Gillies returned to Europe, he has favoured me with the following particulars of this plant:—"The *Cæsalpinia*, called by the natives *Mal de Ojos*, is very abundant in the cultivated parts of Mendoza, where it has the benefit of the water used in irrigation, seeming to be incapable of living on the dry arid lands which are not under cultivation. Along the southern frontier of the province of Mendoza, between the rivers Diamante and Atuel, it is found abundantly with other shrubs in sheltered situations: also among thickets along the western side of the Rio Quarto, near the western boundary of the Pampas; those plants to be found growing in Buenos Ayres owing their origin to seeds sent from Mendoza. They do not ascend farther than to the foot of the mountains, neither are any traces of them to be seen in the province of San Juan, which follows Mendoza to the north, along the foot of the Cordillera of the Andes."

a very different legumen, although the flowers have a very similar structure to those of our plant.

The flowers have a sickly disagreeable smell, and are supposed by the common people to be injurious to the sight. Hence its vernacular name, "*Mal de Ojos*."

On showing my figure of this plant to Dr. Wallich a little previous to its publication, he informed me that he cultivated the plant in the Calcutta Botanic Garden, from seeds sent to him by Dr. Gillies, and that he named this charming plant in his MSS. after our mutual friend, to whom we owe its discovery.

Fig. 1, Persistent base of the calyx, cut through vertically to show the insertion of the stamens and the pistil:—*magnified.* *Fig.* 2, Legume:—*natural size.*

[TAB. XXXV.]

NECKERA DOUGLASSII.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN. CHAR. *Seta* lateralis. *Peristomium* duplex: *ext.* sedecim-dentatum: *int.* e ciliis 16, basi solummodo membrana connexis. *Calyptra* dimidiata.

Neckera *Douglassii;* pinnata bipinnataque, foliis distichis oblongis enerviis apice serrulatis acutis, seta brevi perichætio immersa, capsula exserta ovali. (TAB. XXXV.)

HAB. In rupibus et apud arborum truncos ad plagam occidentalem Americæ septentrionalis, prope flumen *Columbia. Menzies. Douglas. Scouler.*

Caules in cæspitibus laxis nascentes, spithamæi et ultra, procumbentes, flexuosi, pinnati, pinnis gracilibus attenuatis, remotis, patentibus; longioribus iterum pinnatis. *Folia* subarcte disposita, disticha, oblonga, ramorum fere lanceolata, acuta, omnino enervia, transversim undulata, apice serrulata, pallide viridia. *Perichætialia; exteriora* late ovata, acuta, subsquarrosa; *interiora* sensim longiora, longe acuminata, circumvoluta. *Seta* lateralis, perichætii longitudine. *Capsula* paululum exserta, erecta, ovalis, rufo-fusca. *Operculum* sublonge-rostratum, rostro paululum curvato. *Peristomium* luteum: dentibus transversim striatis lineaque longitudinali notatis: *Cilia* his alternantia, transversim striata.

Our indefatigable Naturalists, Messrs. Menzies, Scouler, and Douglas, who have explored the Botany of the north-west coast of America, have added two beautiful species of *Neckera* allied to *Neckera crispa*, to the Muscologia. One, *N. Menziesii*, having been discovered as far into the interior of the country as the Rocky Mountains, is published under that name by Mr. Drummond in his admirable *Musci Americani*, (No. 162.) The other I have now the pleasure of dedicating to Mr. David Douglas, who, not content with accomplishing to the fullest extent the object of his mission, in securing a most extensive and inestimable collection of plants, both living and dried, for the Horticultural Society, suffered no Cryptogamic productions that came in his way to escape him. His Herbarium contains many rare and some new species.

Fig. 1, Plants: *natural size.* *Fig.* 2, Cauline leaf. *Fig.* 3, Leaf from a branch. *Fig.* 4, Perichætium and fruit. *Fig.* 5, Outer perichætial leaf. *Fig.* 6, Inner do. *Fig.* 7, Teeth of the outer peristome. *Fig.* 8, Ciliæ of the inner do.:—*magnified.*

[TAB. XXXVI.]

GRIMMIA CRISPATA.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN CHAR. *Seta* terminalis. *Peristomium* simplex, e dentibus 16, æquidistantibus, integris vel perforatis, rarissime fissis. *Calyptra* mitriformis.

Grimmia *crispata;* caule subramoso, foliis e basi ovatis linearibus tortuosis, seta foliis duplo longiora erecta, capsula ovali lævi, operculo longe rostrato stricto. (TAB. XXXVI.)

Encalypta crispata. *Hedw. Sp. Musc. p.* 61. *t.* 10. *f.* 1–9. *Schwaegr. Suppl.* 1. *p.* 60. *t.* 17. (Icon calyptræ punctorum circulo inclusa.)

Glyphomitrium crispatum. *Brid. Mant. Musc. p.* 30.

Brachypodium crispatum. *Brid. Bryol. Univ. v.* 1. *p.* 147.

Orthotrichum crispatum. *Hook. et Grev. in Brewster's Journ. of Sc. v.* 1. *p.* 115.

Ulota crispata. *Swartz. MSS.*

HAB. In capite bonæ Spei. *Thunberg.* In terram apud Bondebosch, Africæ meridionalis. *D. Mund.*

Caules sublaxe cæspitosi, 6–8 lineas longi, erecti, subramosi, dense foliosi. *Folia* atro-viridia, e basi ovata vel ovato-lanceolata, linearia, acuta, canaliculata, integerrima, nervo valido usque ad apicem attingente percursa, crispata, etiam torta, siccitate præcipue. *Perichætialia* pauca, *caulinis* breviora, latiora, colore pallidiore. *Seta* terminalis, erectus, flavescens, foliis duplo vel etiam triplo longior. *Calyptra* primum angusta, fere subulato-campanulata, striata, demum in laciniis 6, longis, patentibus fissa. *Capsula* erecta, ovalis, viridi-fusca, ore rubro,

sedecim-dentato: dentibus (maturitate,) erectis, vel paululum reflexis, acuminatis, basi latiusculis, pallidis, obscure transversim striatis atque linea media longitudinali notatis. *Operculum* basi planiusculum, rubrum, rostro longo recto flavescente.

Few mosses have been involved in greater obscurity than the present, partly perhaps owing to Hedwig's incomplete and very unsatisfactory figure, and partly owing to my having received from the late excellent Swartz a plant for the *Encalypta crispata* of Hedwig, which I have stated in the *Addendum* to the first edition of the *Muscologia Britannica* to be the same as *Trichostomum polyphyllum*, and which Dr. Greville and myself afterwards published in a Memoir on the Orthotrichoid plants, in Brewster's Journal, as a doubtful species of *Orthotrichum*. Bridel, in his *Bryologia Universalis*, has indeed very much cleared up these difficulties by his excellent description and observations: but still a good figure was wanting to exhibit the character in the clearest light.

I felt, then, peculiar pleasure in receiving, in a packet of mosses from M. Mund, gathered at the Cape of Good Hope, specimens of this plant, and from these I have no hesitation in publishing it as an undoubted species of *Grimmia*, and coming so near to Mr. Drummond's *Gr. Hookeri*, of his *Musci Americani*, (No. 61,) that I should not be surprised if future observations should prove them to be the same. If such be the case, *Grimmia crispata* inhabits stones at the Falls of Niagara, (though rarely,) as well as the Cape of Good Hope. In habit it approaches the *Glyphomitryon Daviesii*, and small specimens of *Trichostomum polyphyllum*. It brings the *Grimmiæ*, too, very near the *Orthotrichoid* family, especially in the structure of the calyptra. The sulcated and lacerated base of this calyptra seems to constitute the only character of Bridel's genus *Brachypodium*; a name (taken from the shortness of the seta,) which it scarcely merits. In this respect it is surely liable to variation. Bridel describes the seta as a little longer than the perichætial leaves; Schwaegrichen as being twice as long.

Fig. 1, Tuft of *Grimmia crispata: natural size.* *Fig.* 2, Single plant. *Fig.* 3, Leaf. *Fig.* 4, Perichætial leaf. *Fig.* 5, Young calyptra. *Fig.* 6, Calyptra advanced. *Fig.* 7, Operculum. *Fig.* 8, Capsule. *Fig.* 9, Teeth of the Peristome:—more or less *magnified.*

[TAB. XXXVII.]

ATROPA RHOMBOIDEA.

PENTANDRIA MONOGYNIA. Nat. Ord. SOLANEÆ.

GEN. CHAR. *Cal.* 5, partitus. *Cor.* campanulata. *Stamina* subexserta. *Bacca* bilocularis, placentis liberis.

Atropa *rhomboidea,* (*Gill. et Hook.*); herbacea, pubescens, foliis rhombeo-ovalibus obtusis, pedunculo unifloro cernuo, corolla extus glabra. (TAB. XXXVII.)

HAB. In sepibus ad vias prope Buenos Ayres. *D. Gillies.*

Caulis vix pedalis, herbaceus, viridis, subquadrangularis, pubescens, ramosus; *rami* foliis oppositi. *Folia* plerumque solitaria, nonnunquam bina, petiolo, vix longitudine folii, instructa, rhomboideo-ovalia, nunc subrotunda, paululum pubescens, superne præcipue nervosa, integerrima. *Flos* solitarius, cernuus, pedunculo longitudine floris, vel parum longiore, deflexo. *Calyx* 5-partitus, laciniis lanceolatis, patentibus, pubescentibus. *Corolla* campanulata, calyce triplo longior, albida, ore quinquefido, laciniis revolutis; *tubus* basi paululum gibbosus, intus versus medium lanatus, extus glaberrimus. *Stamina* prope apicem tubi inserta, decurrentia. *Filamenta* curvata. *Antheræ* subexsertæ, oblongæ, flavæ. *Pistillum*: *Germen* oblongo-ovatum, biloculare, inferne glandula magna car-

nosa, rubicunda cinctum. *Stylus* filiformis, exsertus, basin versus lanosus, albidus. *Stigma* capitatum, sulcatum, viride. (*Gillies MSS.*) *Bacca* oblonga, apiculata. *Semina* majuscula, marginata. *Embryo* albumine immersus, elongatus, filiformi-cylindraceus, subspiraliter curvatus.

Although upon a very much smaller scale, this species of Atropa has a considerable affinity with our *Atropa Belladonna:* the same general mode of growth, and the same shaped solitary flowers. Here, however, the stamens are placed much higher up in the tube of the corolla, and the inside of the tube and the middle of the style have a belt of woolly hairs. Among the South American species that have been described, our plant comes the nearest to *Atropa biflora* of Ruiz and Pavon; but that has frutescent stems, flowers thrice as large, and hairy on the outside, with the stamens far more exserted.

I am indebted to Dr. Gillies not only for the specimens from which the accompanying figure is made, but also for a description made from the living plant in its native country.

Fig. 1, Flower. *Fig.* 2, Interior of the corolla. *Fig.* 3, Pistil, inserted into its annular gland. *Fig.* 4, Berry:—*natural size.* *Fig.* 5, Seed. *Fig.* 6, Section of do., showing the embryo and albumen. *Fig.* 7, Embryo:—all but *fig.* 4 more or less *magnified.*

[TAB. XXXVIII.]

BRACHYMENIUM PULCHRUM.

CRYPTOGAMIA MUSCI. Nat. Ord. MUSCI.

GEN. CHAR. BRACHYMENIUM. *Hook.* *Seta* terminalis. *Per-*

istomium duplex: *ext.* e dentibus sedecim: *int.* membrana brevi reticulata subplicata, apice dentato-laciniata. *Calyptra* dimidiata.

Brachymenum *pulchrum;* densissime cæspitosum, subramosum, foliis late ovatis concavis reticulatis arcte imbricatis nitidis integerrimis, nervo longe excurrente pilifero, capsula erecta pyriformi, operculo conico obtuso. (Tab. XXXVIII.)

Hab. In nemoribus, prope Swellendam, Africæ australis, legit *Cl. Mund.*

Caules subpollicares, in cæspites magnos densissime congesti, subramosi, erecti, inferne valde tomentosi, radiculis ferrugineis intertextis. *Folia* dense imbricata, tenera, late ovata, integerrima, reticulata, pulcherrime nitida, nervo ultra apicem in pilo longo, flexuoso, denticulato excurrente, *Perichætialia* lanceolata in pilum longiorem attenuata. *Seta* terminalis, uncialis, erectus, lævis, basi perichætio bulbiformi instructa. *Capsula* erecta vel paululum inclinata, subapophysata, pyriformis exannulata. *Calyptra* mihi ignota. *Operculum* exacte conicum, obtusum. *Peristomium* duplex: *ext.* e dentibus 16, subulatis, transversim striatis, rubris, madore, patentibus: *int.* membrana, dentibus brevior, erecta, flavo-fusca, subplicata, reticulata, hic illic perforata, apice dentato-laciniata. *Semina* parva, viridia.

The only species of *Brachymenium* hitherto known to me, are those which I have received from Nepal, *B. nepalense* and *B. bryoides, Hook.* The present plant, a native of the Cape of Good Hope, unquestionably belongs to the same genus, and is an extremely beautiful species, forming large dense tufts with closely imbricated, externally very convex shining bright green leaves, each terminated by a long flexuose hair point. Both in the general appearance of the leaves and of the capsule, this plant has considerable affinity with *Leptostomum:* but the peristome is near that of a *Bryum.* The outer teeth I find in this *Brachymenium* to spread out

horizontally when wet, contrary to what is usual among mosses.

Fig. 1, Small tuft:—*natural size.* *Fig.* 2, Plant:—*magnified.* *Fig.* 3, Leaf. *Fig.* 4, Perichætium and Leaf. *Fig.* 5, Single perichætial leaf. *Fig.* 6, Operculum. *Fig.* 7, Portion of the capsule, and of the inner and outer fringe. *Fig.* 8, Portion of the hair point of a leaf:—all more or less *magnified.*

[TAB. XXXIX. XL.]

ON THE GENUS COLLIGUAJA OF MOLINA,

With an Account of three new Species.

The genus *Colliguaja* has been so imperfectly defined by its author, the Abbé Molina, that succeeding botanists have had much difficulty in determining where it ought to be placed, whether among the Crotons, or whether it had sufficient claims to rank as a distinct genus. It is therefore with no small pleasure that I have received from Dr. Gillies no less than four distinct species of the genus, and one in so perfect a state, both as to flowers and fruit, as to enable me to publish almost a complete figure of the essential parts of the fructification.

The only edition of Molina's History of Chili to which I have access, is that in two vols. 8vo. published in English in 1809, and translated from the original Italian, with notes from the Spanish and French versions, and two appendixes by the English editor. The plant called Colliguay is there noticed in two places: 1stly, at p. 129 of vol. 1, where it is said, that "The wood of *Colliguay* (Colliguaja, *nov. gen.*) when burnt, exhales a very agreeable smell, like roses, without producing the least inconvenience:" and 2dly, at

p. 291 of the same volume, when, under the class and order Monœcia Polyandria, the generic character is thus given:

"Colliguaja (gen. nov.) Masc. *Cal.* 4–fidus. *Cor.* 0. *Stam.* 8.

Fæm. *Cal.* 4–fidus. *Cor.* 0. *Styli* 3. Capsula angularis," probably intended for triangularis, "3–sperma."

This is immediately followed by the name of the species, *Colliguaja odorifera*, but without any specific character.

In all probability a more full description is given in some of the foreign editions of Molina, especially the French. Adrian de Jussieu, indeed, knew the plant only from Molina's Hist. Nat. de Chili, p. 129, as he himself acknowledges; yet speaks of the "*shrub* being branched: the *leaves* opposite, thick, glabrous, denticulated: the *flowers* axillary, the male amentaceous, and the female placed beneath them." *Adr. de Juss. De Euphorb. gen. p.* 62. *inter Genera Euphorbiacea minus cognita.*

I know not that any other author has noticed the specific character except Sprengel, who, in his Systema Vegetabilium, has included it under the name of *Croton Colliguay* Molin. with the following definition: "Cr. foliis oppositis subsessilibus lanceolatis denticulatis carnosis scabris, spicis axillaribus, calycibus ♂ 4–fidis." It is most likely that all this rests upon the authority of Molina himself, and as such I employ it to distinguish his original *Colliguay*.

All we yet know of the genus possess a peculiar habit, and all are called indifferently *Colliguay* by the natives. The first species which Dr. Gillies sent to me, for example, (*C. integrifolia, nobis*) is not the Colliguay of Molina: and yet the native name Colliguay was attached to it. This indeed is the only specimen which I possess with flowers, and these are certainly at variance with the description of Molina, especially the male flowers. Nevertheless, so closely are all their species allied in habit, that I am inclined to believe all will be found to possess the same essential marks, and that Molina, in consequence of the small size of the flowers, has been led into error in his account of them. From the result

of my own observations, I am disposed to think that we may thus characterise the genus;—

COLLIGUAJA.

MONŒCIA POLYANDRIA. Nat. Ord. EUPHORBIACEÆ.

GEN. CHAR. *Flores* monoici, amentacei. *Amentum* elongatum, subcylindraceum, basi flore unico fæmineo, floribus reliquis masculinis.

MASC. Col. 0. Car. 0. *Squamæ* ovatæ, patentes, staminiferæ. *Stamina* circiter 10–12 in medio squamæ. *Filamenta* basi submonadelpha.

FÆM. *Cal.* 0. *Cor.* 0. Squamæ nullæ. Bracteæ 2, lanceolatæ, ad basin germinis. *Styli* 2 v. 3. *Capsula* ditricocca, loculis monospermis.

Frutices *mediocres, omnino glabri, erecti, superne præcipue ramosi atque foliosi, lactescentes.* Rami *juniores præcipue rubicundi.* Folia *opposita, raro alterna, brevissime petiolata, magis minusve lanceolata, coriacea, subvenosa, integerrima vel glandulis nigris serrata.* Flores *in amentis terminalibus.* Capsulæ *majusculæ.*

1. Colliguaja *integerrima,* (*Gill. et Hook.*); foliis lineari-lanceolatis integerrimis mucronatis eglandulosis, capsula dicocca, coccis globoso-subcompressis. (TAB. XXXIX.)

HAB. In vallibus Andium apud "San Isidro" et "Villavicenzio" in ascensu ad jugum Uspallata a Mendoza: et apud "San Gabriel," atque "in Valle Caliente," Andibus Chilensibus: alt. 4000 ad 6000 ped.

Frutex parvus, ramosus, ramis plerumque dichotomis inferne nudis, pallide fuscis, cicatricatis, superne rubris, foliosis. *Folia* opposita alternave, bi-triuncialia, lanceolata, rigida, integerrima, acutissima, costata, subavenia, basi attenuata, subsessilia. *Amenta* terminalia, foliis breviora, subcylindracea, erecta, laxa. *Flos* inferior fæmineus, reliquis

masculinis. *Rachis* glabra undique squamosa, *squamis* horizontalibus ovato-subcordatis, disco superne staminiferis. *Stamina* 9–14. *Filamenta* brevia, basi unita. *Antheræ* oblongo-ovales, biloculares, loculis appositis, longitudinaliter dehiscentibus. *Pollen* sphæricum, pallide aureo-flavum. *Flos fœmineus* ad basin amenti, bibracteati. *Bracteæ* ovato-cordatæ, acutæ ad basin germinis. *Germen* subrotundum, læve, biloculare, loculis monospermis. *Styli* duo, vel si mavis, stylus bipartitus, superne glanduliferus, (ubi stigmata,) segmentis subulatis. *Capsula* didyma, dicocca, fere unciam lata, fusca: coccis subrotundis paululum globoso-subcompressis ad marginem acutiusculis, ad angulos dehiscentibus, monospermis. *Semen* pendulum, sphæricum. *Albumen* copiosum. *Embryo* immersus, versus basin albuminis. *Cotyledones* rotundatæ, planæ, ad hilum versæ.

In the present species the seed is not fully ripe, and hence perhaps it has arisen that the albumen did not occupy all its cavity. It appears to have shrunk to a small space in the centre of the seed.

Fig. 1, Amentum of flowers: the single female flower below. *Fig.* 2, Scale bearing the stamens, from which many of the stamens have been removed. *Fig.* 3, Section of the germen, showing the ovules. *Fig.* 4, Capsule:—*nat. size.* *Fig.* 5, Seed:—*nat. size.* *Fig.* 6, Section of do. scarcely ripe, and showing the contracted albumen:—*nat. size.* *Fig.* 7, Section of the albumen, showing the embryo, slightly magnified:—all but *fig.* 5 and 6, *more or less magnified.*

2. Colliguaja *salicifolia*, (*Gill. et Hook.*); foliis lanceolatis obscure glanduloso-serratis acutissimis, capsulis triangularibus tricoccis angulis acutis.

Hab. In Andibus Chilensibus prope "La Guardia," in valle fluminis "Aconcagua:" alt. 5000 ped.

This species has the largest leaves of any, and they taper gradually to a very acute point: their margins are scarcely serrated, and the black glands are very small.

3. Colliguaja *odorifera;* foliis elliptico-lanceolatis obtusis mucronatis pulcherrime glanduloso-serratis, capsula triangulari tricocca, angulis obtusis. (TAB. XL.)

Colliguaja odorifera. *Mol. Chili, ed Angl. v.* 1. *p.* 291.

Croton Colliguay. *Spreng. Syst. Veget. v.* 3. *p.* 875.

HAB. In convallibus Andium versus Mendozam; et in "Valle Caliente," Andibus Chilensibus: alt. 5000 ad 6000 ped.

The almost decidedly elliptical leaves, the numerous regularly arranged black glands on the serrated margin, and the obtuse angles to the capsule, will readily distinguish this from the preceding species. In this and in all the glandular leaved ones, these glands are obliquely sessile ovate, and acuminated, and of a solid texture.

This is the only species which, in the dried state, yields a fragrant smell when the wood is burned; hence I have another argument for considering it to be the *Colliguay* of Molina.

C. *odorifera* has been introduced by Robert Barclay, Esq. of Buryhill, to our green-houses: and in his collection, and that of the Edinburgh Botanic Garden, there are living plants in a very healthy state, but which have not yet borne flowers. The recent foliage is of a dark green hue, and very glossy. In the dried specimens, it always becomes yellowish, or in some instances it inclines to black.

Fig. 1, Capsule, from which one coccus, at *fig.* 2, is removed: *natural size.* *Fig.* 3, Margin of the leaf, with glands:— *magnified.*

4. Colliguaja *triquetra,* (*Gill. et Hook.*); foliis ellipticis mucronatis serratis subglandulosis, capsula acute triquetra.

Hab. In Andibus Chilensibus, una cum *C. salicifolia.*

The leaves of this, in shape, nearly resemble those of the preceding species; but they are scarcely glandular. The fruit, too, is very different, being not only extremely sharp at the angles, but there is scarcely any sinus between the angles, where the cocci join, as in all the other species; so that a section of this would describe an equilateral triangle with straight sides: whereas, a section of the others would rather represent 3 lobes, more or less acute.

[TAB. XLI.]

GYMNOSTOMUM WILSONI.

Gymnostomum *Wilsoni;* foliis oblongo-obovatis obtusis cum mucrone minutissime reticulatis opacis integerrimis margine tenuissimo recurvo, capsula oblongo-elliptica ore paululum contracto, operculo oblique rostrato, calyptra superne scabra. (Tab. XLI.)

Gymnostomum affine. *Wilson MSS.*

Hab. In Anglia ad terram, prope "Over," in comitatu Cheshire. *D. Gul. Wilson.* In arvis apud Forfar, Scotiæ. *Drummond.* Fruct. fert. Jan.

Plantæ cæspitose crescunt. *Radix* tomentosa. *Caulis* plerumque simplex, erectus vel inclinatus, fere ad basin foliosus. *Folia* oblonga-obovata, magis minusve carinata, integerrima, margine tenui recurvo, obtusa, minutissime reticulata, opaca, glauco-viridia, inferne attenuata, laxe reticulata, pellucida; nervo ultra apicem in mucrone longiusculo exserto; superiora majora. *Seta* breviuscula, rufa. *Capsula* oblongo-elliptica, rufo-fusca, basi obscure apophysata, ore subcontracto. *Calyptra* dimidiata, fere recta, superne papilloso-scabra. *Operculum* e lata basi rostratum, rostro tenui, capsula triplo breviore, obliquo.

My attention was first directed to this moss by Mr. Wilson of Warrington, who clearly distinguished it from the species of *Gymnostomum*, to which it is, in natural affinity, most nearly allied, and with which it has probably not unfrequently been confounded by muscologists, namely *G. truncatulum* β. It requires, indeed, a minute examination to distinguish the differences; but they exist so assuredly, that no one who has seen the two together on the same field of the microscope, would ever think of uniting them. To say nothing of the more extended tufts of the present plant, and of its more glaucous hue, the leaves are blunter at the extremity than in *G. truncatulum* β., they have a longer apiculus, a more evident, though a very slender recurved margin, and a structure of cellules so different, that a moderate power of the microscope, which will render those of *G. truncatulum* β. (see the figure in the accompanying plate,) very distinctly visible, is not sufficient to bring them at all into view in our present plant, (*figs*. 3, 4.) Again, in *G. Wilsoni* the capsule is more contracted at the mouth, the beak of the lid is longer, and the calyptra is curiously papilloso-scabrous above.

Mr. Wilson had named this new species of *Gymnostomum* *G. affine* in his MSS., without being aware that Nees von Esenbeck and Hornschuch had so named a moss allied to, or a variety of, *G. Heimii*. Thus I am at liberty to dedicate it to the very acute botanist who first detected and distinguished it, and to whom I am indebted for many valuable specimens of British plants, and numerous and important observations upon them.

Fig. 1, *G. Wilsoni :—natural size.* *Fig*. 2, Single plant :—*magnified.* *Figs*. 3, 4, Leaves. *Fig*. 5, Apex of a leaf. *Fig*. 6, Capsule. *Fig*. 7, Operculum. *Fig*. 8, Calyptra. *Fig*. 9, Leaf of *Gymn. truncatulum* β. to show the difference in form and reticulations :—*magnified.*

[TAB. XLII.]

LEMNA GIBBA.

REMARKS ON THE STRUCTURE AND GERMINATION: BY WM. WILSON, ESQ. OF WARRINGTON.

[ALL who have had occasion to examine the minute seeds of the different species of *Lemna*, must confess that it is extremely difficult, if not impossible, to comprehend their structure satisfactorily, and that germination alone can teach us the true nature of the different parts. The fructification, however, of any of the species may be deemed of rare occurrence. Few botanists have been privileged by seeing the seeds, and still fewer have had the patience to watch and to describe them when in a state of developement; nor, when this is done, can the description be rendered intelligible to another without the aid of magnified figures. I have myself figured and described the fructification of three of our British species of *Lemna* in the new series of the *Flora Londinensis*, but ignorant as I was of the germination of all of them, I confess I could not hazard an opinion on the nature of those parts which were brought to view by the dissecting knife. Nor am I aware of the existence of any representation of the germination of any *Lemna* except that (of *Lemna gibba*) published by Dr. Gærtner, from the observations of Mr. Hartmann, and given in the *Botanische Zeitung* for March 1824, No. 12. These, however, appear to be very imperfect. At length my valued friend Mr. Wilson communicated to me, both in 1827 and 1828, the result of his patient attention to the developement of the seeds of *Lemna*, and the result of these, together with his excellent figures, are here given.—*W. J. H.*]

As I considered (says Mr. Wilson,) that in a state of nature the seeds always remained at the bottom of the water, I did not attempt to immerse those which I preserved through

the winter in a dry state, during that period; nor was it until March 11th that I exposed a few of them to germinate, and from the tardiness of their movements, compared with others immersed afterwards, I am confirmed in my original opinion, that they could not be made to grow much earlier than April. The dissections of the seed last year proved of considerable service, and enabled me to understand better the singular appearances which present themselves.

When the seeds have been macerated for five or six days, they imbibe sufficient water to enable them to sink to the bottom: previous to this they swim on the surface, and when almost ready to descend, the upper end of the seed, from which the embryo bursts forth, is turned downwards.

After lying at the bottom a few days, the embryo expands and bursts the inner coat of the seed, elevating its upper portion, which is always circular, with a small rather thick *umbo* at its centre. I term this part the *scutellum,** as it seems destined to protect the embryo from injury while breaking through the external covering, which is of a rather firm texture, though much thinner in the part intended for the transmission of the embryo than it is elsewhere. Between this part and the apex of the inner coat of the seed there is at first a considerable vacancy, and it is only after the rupture of the inner coat that the embryo is sufficiently swelled to arrive at the outer barrier, and force open a passage. (*Fig.* 1.)

At the time when that is accomplished, the embryo becomes visible, bearing on its summit the scutellum, firmly attached by its centre only, to the lower lip of the *cotyledon,*†

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* This is no doubt the dark spot figured in the section of the seed of *Lemna trisulca*, given at *fig.* 13 of the plate in the *Flora Londinensis*, and which I have there spoken of as a *sort of operculum.*—*W. J. H.*

† The names of the different parts are given rather from a supposed resemblance to such parts in other seeds whose structure is well known, than from a full conviction of the correctness of their application. A structure so anomalous might well create doubts in the minds of the most experienced botanists. —*W. J. H.*

and also covering, with a portion of its circumference, the upper one, which, however, very soon forces the scutellum aside, and projects beyond it. The cotyledon, at first erect, now takes an oblique direction, and ultimately an horizontal one, (*fig.* 2,) and soon after its appearance the seed rises to the surface of the water.

Then the plantule, hitherto concealed, begins to extend its disc beyond the lips of the cotyledon, passing over the scutellum, and projecting far beyond it. The spur of the plantule, seated within the cavity (*fig.* 3, *a*,) of the lower lip, also grows larger, and its gradual developement is marked by a continually increasing prominence just below the scutellum, (*figs.* 6, 7, 8,) in the middle of the lower lip, which is at length pierced, (*fig.* 9,) and the spur becomes the root of the now almost erect plantule. The root bears at its extremity a sheath, not formed of a portion of the lower lip, as I once erroneously supposed, but precisely similar to that found on the roots of the parent plants or innovations afterwards produced, (*figs.* 9, 10, 11, 12, 13.) The root continues to grow until it is about six times as long as the seed, (sometimes it remains very short,) and the lower portion of the embryo within the integuments of the seed now swells, and becoming slightly bulbous at its extremity, is securely retained within them.

An innovation or secondary plant, from one or other of the sides of the plantule, (*figs.* 10, 12, 13,) near the insertion of the root, now makes its appearance. (I do not remember to have seen an instance in which there was one on each side of the same plantule, though I have frequently seen a second innovation afterwards arise close to the first.) Its developement is exactly similar to those subsequently produced, and the spur or root does not pierce any portion of the plantule, but slips from the lower margin of the fissure, which has the same appearance as the (so termed) calyx in the fertile plant.

This secondary plant usually bears two innovations on each side, and at the time when the plantule has thus given birth to a race of grandchildren, viviparously produced, the cotyledon remains attached to the whole, without any

symptoms of decay, and the integuments of the seed are still retained unaltered by the lower portion of the *embryo.* At this stage, the plantule appears to be destitute of gibbosity on its lower surface, but the secondary frond is slightly convex below, and the tertiary ones still more so.

The scutellum, it must be observed, has always a greater diameter than the orifice of the lower portion of the inner coat of the seed. This puzzled me at first; and it was only after a very careful dissection that I ascertained the fact of the inner coat being formed of three distinct skins, and that the scutellum is formed of different proportions of each; the inner one * being the largest (*fig.* 14, *a*,) and the middle one the smallest of the three, (*fig.* 14, *b.*) They are all of a circular figure, and the fissure in each of the skins is differently situated. In one instance I found the scutellum, after the expansion of the embryo, not wholly detached from the lower portion of the inner coat of the seed, and entirely separated from the lip of the cotyledon, except perhaps the inner reticulated portion, which, I have reason to think, was carried up with the cotyledon.

References to the Plate, Tab. XLII.

Fig. 1, The embryo just bursting through the outer coat of the seed.

Fig. 2, The same more advanced; *a*, the scutellum; *b*, the lower lip of the cotyledon; *c*, the upper lip of do.

Fig. 3, The same a little more advanced; the lips of the cotyledon being open, the scutellum adhering to the extremity of the lower lip, and exhibiting the plantule with its spur or radicle (*a*,) within.

Fig. 4, The same after the removal of the coats of the seed.

Fig. 5, The inner coat of the seed, with the scutellum or upper portion, (*a*,) which always separates from the lower part at a circular fissure.

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* The inner skin proves to be *albumen.* This part is much more obvious in the seed of *L. minor.*—*W.*

Fig. 6, Shows the embryo still more advanced, the lower lip in front.

Fig. 7, The same, (a side view,) as seen in water against the light, showing the spur (or radicle) of the plantule projecting into the lower lip of the cotyledon.

Fig. 8, The same still more advanced, when the spur is about to burst through the lower lip.

Fig. 9, Shows the spur after it has perforated the lower lip. It is now become the root, having a sheath at its extremity.

Fig. 10, Shows the innovation just shooting forth.

Fig. 11, An innovation with its spur or radicle growing at the side of the primary plant, which in this instance was bent sideways.

Fig. 12, The primary plant, with the innovation shooting forth its root.

Fig. 13, Another view of the same. At this stage the cotyledon is undecayed, and the coats of the seed still closely retain the lower portion of the cotyledon or embryo.

Fig. 14, The scutellum or upper portion of the inner coat of the seed, removed from the lower lip of the cotyledon. It is formed, like the remaining portion of the inner coat, of three distinct skins: the innermost, (or lowest, *a*,) reticulated and colourless: the middle one, (*b*,) of a reddish brown colour and firmer texture, not reticulated: the outer, (or upper one, *c*,) pellucid and somewhat radiated. They differ in size considerably, the inner or lower one being largest, and the middle one the smallest of the three, and invariably circular; the two others have their edges sometimes irregularly torn. In the figure the inner membrane is shown almost separated from the two others; they are, however, connected at the centre.

Fig. 15, The two upper coats, or skins of the scutellum, detached from the lowest one.

Fig. 16, The inner or lower coat of the scutellum, showing its reticulated structure.

[TAB. XLIII. XLIV. XLV.]

ON THE SPECIES OF THE GENUS COLLETIA, OF THE NATURAL ORDER RHAMNEÆ,

Discovered by Dr. Gillies *in South America.*

The genus *Colletia,* named by Commerson in honour of his countryman *Collet,* a botanist who, we are informed, studied the plants of Bresse, and proved a great opponent to the system of Tournefort, was established in the Genera Plantarum of Jussieu, I believe upon the *C. spinosa, Lam.,* (*C. horrida, Willd.*) a native, it is said, of Brazil, Chili, and Peru: and the main character is made to depend, according to Jussieu, Lamarck, Willdenow, and in part, De Candolle, upon the campanulate perianth or calyx having 5 *plicæ* internally, which are squamiform; yet the *C. spinosa* presents nothing of this kind, nor has any species of the genus that has come under my observation. Kunth,* too, who has examined Jussieu's own specimen, expressly says, that he "could not detect the plicæ mentioned by Jussieu," but he observed within, an "annular, narrow, fleshy, entire disc, reflexed and glabrous, inserted above the base of the calyx," exactly as I find in all Dr. Gillies's undoubted species of *Colletia.*

Ventenat, in his Jardin de Cels, added *C. obcordata,* and in his Choix de Plantes, *C. serratifolia,* and *C. Ephedra;* all, as well as *C. horrida,* having opposite spinous branches and few or no leaves, together with campanulate flowers; but these, except *C. serratifolia,* M. Kunth thinks should constitute a peculiar genus, on the one hand allied to *Colletia* and *Rhamnus,* on the other to *Ceanothus,* differing from the true *Colletiæ* in the presence of petals, and in the absence of a disc. Hence that author excludes from his generic character the 5 squamiform plicæ to the calyx and the petals, and defines the disc as above in describing that of *C. horrida:* "*Discus* annularis, angustus, carnosus, integer, calyce supra basin

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* Nov. Gen. v. 7, p. 46.

insertus, reflexus." De Candolle, in his Prodromus, retains the characters, "Calyx intus villosus aut 5–plicatus: *Petala* 0;" but so far adopts the idea of Kunth as to include only *C. horrida* and *C. serratifolia* among the *Colletiæ veræ*, whilst *C. obcordata* and *C. Ephedra*, are put into the section (?) *Retanilla.* The others come among the "species *non satis notæ.*"

Thus stood the genus Colletia, till 1827, when M. Adolphe Brongniart's "*Memoire sur la famille des* RHAMNE'ES," appeared in the 10th vol. of the Annales des Sciences Naturelles. There, part of the character of *Colletia* runs, "*Petala* nulla vel minutissima, linearia," and "*Discus* brevis, cupulæformis, fundo calycis adnatus:" and the species included are *C. horrida, serratifolia, tetragona,* a new species from Peru, and *C. pubescens,* a New Holland one from my Herbarium, which has a short tube, petals, and a disc of a very different character from that of *C. spinosa,* to which is added, as a "species affinis," *C. infesta* (*Ceanothus infesta, Kunth* and *De Candolle,* which has petals and a disc lining the whole tube:—while *Colletia obcordata* and *C. Ephedra,* of *Vent.* are transferred to the new genus *Retanilla.*

In all the species now noticed, there is so strong a general resemblance that it seems almost a pity to separate them generically, and Brongniart, who has so done, has nevertheless included into his *Colletia* species with and without petals, and with a disc of at least three very different structures. If, therefore, *Retanilla* is to be removed from *Colletia,* by the same rule *C. pubescens* and *C. infesta* ought to be: and, now that we are acquainted with three other *Colletiæ,* from the travels of Dr. Gillies, agreeing in every essential particular with the generic character of *C. horrida,* I shall deem this latter the type of the genus, which I would thus define:

COLLETIA.

Cal. subcampanulatus, 5–fidus, coloratus, supra-basin demum circumscissus. *Petala* nulla. *Antheræ* reniformes vel cordatæ, subuniloculares sulco hippocrepico dehiscentes. *Discus* annularis, angustus, carnosus, integer, reflexus, supra basin calycis insertus. *Germen* superum vel

subinferum. *Stylus* subexsertus. *Stigma* incrassatum, obsolete trilobum. *Capsula* 3–cocca, 3–sperma, inferne basi calycis cincta.

Frutices, *cortice viridi tecti, valde ramosi.* Rami *decussatim oppositi, spinescentes.* Folia *opposita, pauca vel nulla.* Flores *pedunculati e tuberculis axillaribus ad basin spinarum erumpentes.*

"No organ in this family," observes M. Brongniart, "presents more numerous modifications, or more important for classification, than the *disc.*" If this be the case, we shall surely be correct in confining the genus *Colletia* to those individuals of this tribe which have the disc constituted as above described. Brongniart describes this disc as being cupulæform, or cup-shaped, which, however correct in reality, does not convey the idea of the appearance of this disc that the words of M. Kunth do. I have seen nothing like it in any other plants of the order. The probability, indeed, is, that this disc originates at the very base of the germen, that it lines the very bottom of the calyx, but with a coat so thin, that, though distinctly represented as such in the figure of *Colletia spinosa* figured by Brongniart, I have not myself been able to discover it. A little above the base, the disc becomes distinctly visible, and forms a narrow, fleshy, entire, reflexed ring. It is at its insertion that the separation takes place, as the fruit advances to maturity, when the base remains and surrounds the base of the fruit.

* *Spinis Latissimis.*

1. Colletia *cruciata*, (*Gill. et Hook.*); foliis paucissimis ellipticis integerrimis, caule horrido spinis decussatis lateraliter compressis ovatis acutissimis decurrentibus. (Tab. XLIII.)

Hab. In collibus arenosis prope "Maldonado," Rio de la Plata.

Frutex tri-quadripedalis, erectus, ramosus. *Rami* decussatim oppositi, subangulati, ubique *spinis* magnis horridis decussatis, lateraliter compressis, ovatis acutissimis, pun-

gentibus, decurrentibus tecti. *Folia* perpauca, valde caduca, ad basin spinarum, elliptica, integerrima, basi in petiolum brevem attenuata. *Flores* fasciculati, parvi, ad basin spinarum inserti, nutantes. *Pedunculus* flore brevior. *Calyx* cylindraceo-campanulatus, corollinus, albidus, basi solummodo viridis, obscure decemstriatus, apice quinquefidus, segmentis patentibus. *Petala* 0. *Stamina* 5, fauce intra calycis segmenta inserta. *Filamenta* brevissima. *Antheræ* subrotundæ, subuniloculares, bivalves, rima arcuata dehiscentes, valva inferiore minore. *Discus* annularis, carnosus, revolutus, integer. *Pistillum: Germen* liberum, ovatum, sulcis tribus obscuris longitudinalibus notatum. *Stylus* filiformis, longitudine fere tubi. *Stigma* incrassatum, parvum, trilobum.

This, one of the most singular among the many curious plants in Dr. Gillies's rich collection of South American plants, was gathered during a hasty visit from the ship to the shores of the Banda Oriental, near Maldonado. It may be considered as constituted of a mass of opposite decussated and decurrent large laterally compressed spines, of the same dull green colour as the central portion or stem that unites them, and equally woody. The tips are darker coloured, sometimes brown, and very pungent. If the fascicle of flowers appears from any point except that of the base of a spine, it is either at the extremity, or below some slight swelling, and is indicative of a new spine which is about to appear. The leaves are so rare that only one could be found upon any of the specimens, and that upon one of the youngest branches. The form and structure of the flowers are very similar to those of *Colletia ferox*.

TAB. XLIII. *Fig.* 1, Flower. *Fig.* 2, Section of the same. *Fig.* 3, A leaf:—*magnified.*

* * *Spinis subulatis.*

2. Colletia *spinosa;* spinis validis, florum fasciculis sparsis, calycibus urceolatis, filamentis elongatis exsertis. (TAB. XLIV. A.)

α. *glabra.*

Colletia spinosa. *Lam. Ill. v.* 2. *p.* 90. *b.* 129. *Humb. et Kunth Nov. Gen. Ann. v.* 7. *p.* 59. *Roem. et Schultz. Syst. Veget. v.* 5. *p.* 512. *De Cand. Prodr. v.* 2. *p.* 28. *Spreng. Syst. Veget. v.* 1. *p.* 771.

Colletia horrida. *Willd. Sp. Pl. v.* 1. *p.* 1113. *Vent. Hort. Cels. p.* 92. (vix Brongniart.)

Colletia polyacantha. *Willd. in Roem. et Schultz. Syst. Veget. v.* 5. *p.* 113.

β. *pubescenti-incana.*

Hab. α. In ascensu Andium a convalle Uspallatensi ad "Ladera de las Vacas," atque in Andibus Chilensibus, prope "La Guardia," in valle fluminis "Aconcagua:" alt. 5000 ad 7500 ped.—β. Apud "Romeral" prope urbem Chilensem "Curico," ubi *Yaqui* ab incolis vocatur.

Lamarck appears to be the original authority for this species, which he has figured under the name here adopted in his Illustrationes. Brongniart adopts the name of *horrida;* but in the figure which he has given of the flowers, I find a considerable difference from that of Lamarck, for he represents the filaments of the stamens so short, as not to raise the anthers above the margin of the sinuses of the segments,—a character so nearly corresponding with our next plant, that I have little hesitation in referring it to that species.

Tab. XLIV. A. *C. spinosa. Fig.* 1, Flower. *Fig.* 2, Section of do. *Fig.* 3, Stamen:—*magnified.*

3. Colletia *ferox,* (*Gill. et Hook.*); spinis validis, florum fasciculis sparsis, calycibus oblongo-cylindraceis, antheris subsessilibus. (Tab. XLIV. B.)

Colletia horrida. *Brongniart in Ann. des Sciences Nat. v.* 10. *p.* 366. *t.* 14. *f.* 1.?

Hab. Prope Mendozam et in convallibus Andium versus Mendozam: alt. 2600 ad 5000 ped.

This does not appear to differ in any particular from the preceding species, except in the rather longer flowers, which

are broader and less urceolate; and in the anthers having filaments so exceedingly short, that without a very minute examination they might be entirely overlooked. Brongniart's figure of *C. horrida* represents the anthers as almost wholly included within the tube of the calyx: and the segments of the calyx are given as erect, whereas in our plant they are remarkably revolute.

Tab. XLIV. B. *C. ferox. Fig.* 1, Flower. *Fig.* 2, Stamen. *Fig.* 3, Young fruit. *Fig.* 4, Ripe fruit: *natural size:*—all but *fig.* 4 *magnified.*

4. Colletia *ulicina*, (*Gill. et Hook.*); spinis tenuibus numerosissimis, floribus fasciculatis in apicem ramorum congestis, calycibus elongato-cylindraceis, filamentis intra tubum insertis. (Tab. XLIV. C.)

α. *glabra.*

β. *pubescenti-hirsuta.*

Hab. Fruticetis prope "El Rancho" in valle fluminis "Tingririca," in Chile: alt. 3000 ped.

Frutex pedalis, bipedalisque, facie *Ulicis nanæ*, ramosissimus, subdecumbens, in α. glaber, in β. pubescenti-hirsutus, ramulis brevibus densis e spinis gracilibus decussatim ramosis formatis, viridibus, siccitate striatis, acutissimis, pungentibus. *Folia* omnino nulla? *Flores* nunc, raro, solitarii; plerumque fasciculati, e basibus spinarum orti, ad apices ramorum in capitulum elongatum vel spicam densam congesti. *Pedunculus* brevis, curvatus. *Calyx* ruber, elongato-cylindraceus, infra medium subcontractus, apice quinquefidus, segmentis oblongo-ovatis recurvatis: intus, supra basin *discus*, annulatus, annulo carnoso, inflexo. *Petala* 0. *Stamina* 5, intra tubum, paulo supra medium, inserta. *Filamenta* brevissima: *Antheræ* reniformes, bivalves, rima vel sulco hippocrepico dehiscentes, uniloculares. *Pistillum: Germen* semisuperum, subrotundo-trilobum: *Stylus* calyce multo brevior, elongato-cylindraceus: *Stigma* subcapitatum, obtusum, obscure trilobum. *Fructus* (vix maturus) magnitudine *Pisi sativi*,

globoso-trilobus, basi calyce circumscisso cinctus, trilocularis, (demum tricoccus?) trispermus. *Semina* atra, nitida, erecta, ovali-oblonga.

This is very distinct from every species of *Colletia* hitherto described, in the small very numerous dark-green spines, and in the fascicles of flowers being collected so abundantly about the extremities of the branches, as to form an apparently dense raceme or spike, in the very elongated calyx, of a reddish colour, and in the stamens being inserted a considerable way down within the tube.

TAB. XLIV. C. *C. ulicina. Fig.* 1, Flower. *Fig.* 2, Section of do. *Fig.* 3, Stamen. *Fig.* 4, Fruit:—*natural size. Fig.* 5, Section of fruit:—*magnified.*

DISCARIA. *Hook.* (nov. gen.)

Calyx brevi-campanulatus, 4–5 fidus, coloratus. *Petala* 4–5, staminibus minora. *Antheræ* biloculares, longitudinaliter dehiscentes. *Discus* basin germinis cingens, pateriformis, carnosus, margine angusto elevato, libero, subintegro. *Germen* subsuperum. *Stylus* brevis. *Stigma* trilobum.

Habitus omnino *Colletia.* Nomen a *δισκος, discus.*

Discaria *Americana,* (*Gill. et Hook.*); calyce (plerumque) 5 fido, segmentis reflexis. (TAB. XLIV. D.)

HAB. Prope "Buenos Ayres:" atque in radicibus montium Provinciæ Sancti Ludovici, et "Cordova."

The whole structure of this plant, save the distinguishing marks above given in the generic character, is so similar to that of *Colletia spinosa,* that a description is scarcely necessary. To this genus must unquestionably be referred the *Colletia pubescens* * of Brongniart, of which I have given a figure of the flower at TAB. XLV. A.

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* This plant, a native of Cox's River, at Bathurst, and the banks of the Macquarie, New Holland, is described by Mr. Allan Cunningham in his valuable "Specimens of the Indigenous Botany of the Mountainous Country be-

RETANILLA.† *Brongn.*

Retanilla *Ephedra.* *Brongniart in Ann. des Sc. Nat. v.* 10. *p.* 364. *t.* 14. *f.* 2.

Colletia Ephedra. *Vent. Choix. des Pl. t.* 16. *De Cand. Prodr. v.* 2. *p.* 29.

HAB. In convallibus Andium Chilensium: alt. 2500 ad 3500 ped.

This genus is fully described by Brongniart, in the Memoir above quoted. Dr. Gillies's specimens have only the ripe fruit, which is as large as a hazel nut, and very different in its nature from that of *Colletia.* The flowers, too, have the disc clothing the whole internal surface of the calyx, according to Brongniart; but M. Kunth appears to have entirely overlooked it.

In Dr. Gillies's collection of plants of this Nat. Order, are two species with opposite and decussate spines and numerous 3 or 5 nerved leaves, one is in flower and fruit, the other

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tween the Colony round Port Jackson and the Settlement of Bathurst," published in Mr. Barron Field's Memoirs on New South Wales, p. 352, n. fl., as "a second new genus of the order *Rhamneæ,* and related to *Colletia.*" He thus defines it: "*Calyx* seu *Perianthium* monophyllum, quadrifidum. *Cor.* 0, sed squamæ 4, cucullatæ inter segmenta perianthii. *Antheræ* 2-loculares, sub singulis squamis. *Stigma* trilobatum. *Germen* 3-loculare.—A junceous shrubby plant, with brachiate strong thorns." As a species, it may be thus characterized:

Discaria *australis;* calyce 4-fido, segmentis erectis.

Colletia pubescens. *Brongn. in Ann. des Sc. Nat.* v. 10. *p.* 366.

The name *pubescens* is scarcely applicable, for, in general, the stems, branches, and thorns are quite glabrous. The branches are more elongated than in *S. americana,* the thorns rather more distant, the flowers smaller, the stigmas narrower and more erect. In other respects there is the most entire conformity. *Leaves* few, small, oblong, entire.

TAB. XLV. A. *Fig.* 1, Flower. *Fig.* 2, Section of the same. *Fig.* 3, Petal and Stamen. *Fig.* 4, Petal. *Fig.* 5, Pistil, with the pateriform fleshy disc at the base, removed from the lower part of the calyx.

† Jussieu says that the *Colletia Ephedra* of Ventenat bears the name of Retanilla in Dombey's Herbarium, as the *Colletia spinosa* does that of *Retama.*

barren, but as far as can be judged from habit, they will rank in the same genus. These I shall describe under the generic name which I find attached to the plant in Dr. Gillies's handwriting.

TREVOA. *Miers' MSS.*

Gen. Char. *Calyx* turbinatus, 5-fidus, persistens, segmentis reflexis. *Petala* cucullata, erecta, stamina includentia. *Antheræ* uniloculares, rima hippocrepica dehiscens. *Discus* omnino nullus. *Germen* superum, magnum, hirsutum, triloculare, loculis monospermis. *Stylus* subulatus, longe exsertus, hirsutissimus. *Stigma* simplex, acutum. *Capsula* membranacea, stylo persistente terminata, bivalvis, monosperma, loculis duobus abortivis. *Semen* erectum, ellipticum, compressum, fuscum, nitidum, hinc linea longitudinali sulcatum. *Albumen* subtenue, corneum. *Embryo* erectus, cylindraceus: *radicula* infera.

Frutices *spinosæ, spinis subulatis breviusculis cruciatim oppositis.* Folia *quaterna, majuscula, numerosa, longitudinaliter venosa.* Flores *fasciculati e tuberculo egredientes, ex axillis foliorum et infra basin spinarum.*

Trevoa *quinquenervia*, (*Gill. et Hook.*); pubescenti-hirsuta, foliis oblongo-ellipticis integris quinquenerviis subtus incanis. (Tab. XLV. B.)

Hab. In convallibus Andium Chilensium: alt. 3500 ped. Nom. vernac. *Talguen.*

Rami liguosi, erecti, subvirgati. *Folia* brevi-petiolata. *Flores* numerosi, sublonga, pedunculati. *Calyx* decemstriatus. *Fructus* calyce inferne tectus, valde hirsutus.

Tab. XLV. B. *Fig* 1, Portion of a branch :—*natural size. Fig.* 2, Flower. *Fig.* 3, Section of a flower. *Fig.* 4, Petal, including a stamen: the pollen having escaped from the anther. *Fig.* 5, Fruit; and *fig.* 6, Seed:—*natural size. Fig.* 7, Capsule. *Fig.* 8, Transverse section of the pericarp; showing the single seed and the two abortive cells. *Fig.* 9, Seed. *Fig.* 10, Vertical section of do.

2. Trevoa *trinervia*, (*Gill. et Hook.*); glabra, foliis ellipticis crenato-serratis trinerviis subtus concoloribus.

Hab. In planitie "Maypu" prope "el Peral," in Chile: alt. 2000 ad 2500 ped.

Spines rather shorter than in the preceding. *Leaves* larger. *Branches* and *spines* green.

[TAB. XLVI. XLVII. XLVIII. XLIX.]

ON THE SPECIES OF THE GENUS VERBENA, AND SOME NEARLY ALLIED GENERA,

Found by Dr. Gillies *in the extra tropical parts of South America.*

The temperate parts of South America appear to be particularly abundant in the genus *Verbena*, and it may probably be there considered to have its maximum. Fourteen species are enumerated by Humboldt and Kunth in the *Nova Genera et Species Plantarum*, of which 13 are new. Forty-five species are described in the *Systema Vegetabilium* of Professor Sprengel, of which 32 are natives of various parts of South America. Dr. Gillies, whose researches were principally directed to the vicinity of Mendoza, in lat. 33° south, but which also extended to Buenos Ayres on the one hand, in south lat. 36°, and on the other to the western or Chilian side of the Cordilleras, reckons 24 species in his Herbarium, of which 18 have been hitherto unnoticed by preceding botanists. An account of them cannot but be acceptable to the systematic botanist. Two of the species, *V. officinalis* and *V. bonariensis*, are found in other and very distant countries: the rest appear to belong exclusively to the American continent in the southern hemisphere. To these I have added species of the nearly allied genera, *Lippia*, *Priva* (*Castelia* of Cavanilles,) and a *new genus*, found in the same countries, and by the same gentleman.

* *Corolla quadrifida.*

1. Verbena *gratissima*, (*Gill. et Hook.*); foliis oblongo-ovatis breve petiolatis coriaceis integerrimis subtridentatisve, floribus verticillato-spicatis, spicis lateralibus, calycibus hispidissimis.

Hab. In montosis prope Mendozam, ubi "*Cedron*," incolarum, locis arenosis saxosis: alt. 3000 ad 3500 ped.

Frutex 8–10 pedalis, ramis strictis, gracilibus. *Folia* opposita, vix unciam longa, petiolo brevissimo insidentia, coriacea; *juniora* minute scabra; *adulta* glabra, subtus pallidiora, punctis glanduliferis numerosissimis fragrantibus adspersa. *Corolla* parva, semper quadrifida. *Calyx* pilis patentibus hispidissimus.

A very distinct species, yet in habit allied to the well known *Aloysia citriodora*, (*Verbena triphylla*, *Linn.*); and, like that, yielding a most grateful odour. The *Aloysia* has, however, only two seeds to each flower, whilst our plant has four, and the flowers themselves are similar in structure to those of *Verbena officinalis*. The calyx firmly envelopes the fruit, and not unfrequently separates naturally into four pieces or segments, each very concave and bearing an oblong smooth nut.

2. Verbena *officinalis;* caule erecto subhispido, foliis lanceolatis inciso-serratis trifidisque segmentis incisis scabris, spicis filiformibus subpaniculatis, floribus remotiusculis.

Verbena officinalis. *Linn. Sp. Pl. p.* 29. *Engl. Bot. t.* 767. *Fl. Lond. cum Ic. Humb. et Kunth, Nov. Gen. v.* 2. *p.* 222. *Spreng. Syst. Veget. v.* 2. *p.* 750.

β. foliis grosse serratis vix profunde incisis.

Hab. α. In Pampas ab urbe Bonaria usque ad Mendozam. β. Apud Rio Saladillo, ad limites occidentales planitiei *Pampas* dictæ, et ad margines aquarum in Provinciæ Mendozæ.

Var. β. differs from the α. and the common European state of the plant, solely in the less deeply cut leaves.

* * *Corolla quinquefida.*

† *Inermes; foliis integris integerrimisque.*

3. Verbena *aphylla*, (*Gill et Hook.*); ramis flexuosis teretibus striatis glabris aphyllis, spica pubescente. (Tab. XLVI.)

Hab. Inter "Los Chacayes y los Arbolitos," in ascensu Andium versus Mendozam, et in valle "de Las Lenas Amarillas," in ascensu "*Planchon*:" alt. 4500 ad 5000 ped. *Gillies.*—Prope Villa Vicenzia. *D. Cruickshanks.*

Caules ramosissimi, 3–4 pedales, striati, ramis flexuosis, teretibus, oppositis, acutiusculis, omnino aphyllis. *Stipulæ* ad basin ramorum, minutæ, fuscæ, demum deciduæ. *Spicæ* unciam ad duas uncias longæ, ramos breves terminantes, multifloræ. *Flores* fragrantes, odore melleo spirantes. *Bracteæ* minutæ. *Calyx* cylindraceus, pubescens, angulatus, corolla duplo brevior.

Fig. 1, Flowers and bractea. *Fig.* 2, Stamens and Pistil:—*magnified.*

4. Verbena *scoparia*, (*Gill. et Hook.*); ramis erectis strictis superne congestis sulcatis, foliis minutis remotissimis lineari-oblongis integerrimis, spica glaberrima, floribus laxis. (Tab. XLVII.)

Hab. In vallis prope Villavicenzio, in ascensu orientali a Mendoza ad jugum "Uspallata." Apud "Los Ojos de Agua," Andibus Chilensibus: alt. 5000 ad 8000 ped. *Nom. vern.* "Clavelillo (*Pink*) del Campo," et "Escobilla (*Broom*) del Campo."

Frutex 3–4 pedalis, ramis numerosis, erectis, teretibus, strictis, sulcatis, superne congestis, siccitate nigrescentibus. *Folia* perpauca, opposita, decidua, vix trilinearia, lineari-oblonga, basi in petiolum brevem attenuata. *Spicæ* numerosæ, terminales, omnino glabræ. *Flores* odorati, laxi. *Bracteæ* subulatæ, calyce dimidio breviores. *Calyx* longe cylindraceus in pedicellum brevem basi attenuatus. *Corollæ* tubus curvatus calyce plusquam duplo longior, fauce pilosa.

Fig. 1, Flower and bractea. *Fig.* 2, Stamens and Pistil:—*magnified.*

5. Verbena *juncea,* (*Gill. et Hook.*); suffruticosa, ramis elongatis teretibus glabriusculis, foliis remotis parvis oblongolancoelatis integerrimis vel serratis, petiolo brevi inferne latissimo decurrente, spicis oblongis laxis, stylo exserto.

α. foliis integerrimis, spicis pubescentibus.

β. foliis grosse serratis, spicis glabriusculis.

HAB. α. Prope La Guardia, in valle fluminis Aconcagua, in Chile. β. Ad "Rio del Diamante," in confinibus australibus Provinciæ Mendozæ: alt. 5000 ped.

Tripedalis, basi fruticosa, superne ramosa, herbacea, ramis elongatis, attenuatis, teretibus, glabris, vel sub lente minutissime pubescentibus, junciformibus. *Folia* remota, semiunciam longa, ovato-lanceolata, subcoriacea, glabra, in α. integerrima, in β. grosse serrata, basi breviter petiolata, petiolo inferne dilatato, decurrente. *Spicæ* duas uncias longæ, subcylindraceæ, basi bifoliosæ. *Flores* laxiusculi. *Bracteæ* minutæ. *Calyx* cylindraceus, glaber aut pubescens, etiam subglanduloso-pilosus, sessilis. *Corolla* calyce triplo longior, curvata, limbo parvo. *Stylus* sublonge exsertus.

6. Verbena *spathulata,* (*Gill. et Hook.*); suffruticosa, ramis elongatis attenuatis flexuosis glabris, foliis remotiusculis lineari-spathulatis integerrimis pubescenti-scabris, spicis capitatis oblongis pubescentibus.

HAB. In valle de "las Lenas Amarillas," Andibus Mendozæ.

Bipedalis, inferne fruticosa, superne subherbacea, ramis elongatis, flexuosis, subulatis, siccitate nigrescentibus, glabris, superne attenuatis. *Folia* rara, remota, superne præcipue, unciam vel sesquiunciam longa, lineari-spathulata, sessilia, siccitate margine revoluta, pubescenti-aspera: suprema linearia, minora. *Capitula* uncialia. *Flores* numerosi, imbricati. *Bracteæ* lanceolato-subulatæ, calyce dimidio breviores. *Calyx* cylindraceus, dentibus elongatis. *Corollæ* tubus pubescens, calyce dimidio longior.

7. Verbena *glauca*, (*Gill. et Hook.*); suffruticosa, ramis elongatis teretibus filiformibus glaucis, foliis distantibus minutissimis linearibus, capitulis ovatis subpubescentibus, floribus dense imbricatis, bracteis exterioribus calyce duplo majoribus cordatis rigidis pungentibus.

Hab. Prope flumen "del Diamante," ad "Paso de los Ancos:" alt. 5000 ped.

Species distinctissima ob caules filiformes, glaucescentes, folia remota minuta, vix 3 lineas longa, ob capitulum florum extus bracteis longis rigidis magnis instructum. *Bracteæ* interiores minores.

8. Verbena *aspera*, (*Gill. et Hook.*); fruticosa, foliis alternis plerumque fasciculatis oblongo-lanceolatis acutis subpiloso-asperis, spicis elongatis imbricatis sessilibus pubescentibus, floribus imbricatis calyce duplo longioribus.

Hab. Locis incultis inter Mendozam et Jugum Andium: alt. 2800 ad 8500 ped.—In convalle Uspallata. *Gillies et Cruickshanks.*

Caules et *rami* adulti lignosi, pallide fusci. *Rami* patentes, juniores pilosi vel pubescentes. *Spicæ* 2 ad 4–5 uncias longæ, breviores magis dense imbricatæ. *Bracteæ* subulatæ, longitudine fere calycis. *Flores* albi, glabri. *Fructus: Nuces* 4, primum arcte unitæ.

Remarkable in having alternate leaves.

† † *Spinescentes.*

+ *Folia adulta stipulis spinescentibus æmulantia.*

9. Verbena *juniperina*, (*Gill. et Hook.*); fruticosa ramosissima pubescens, foliis oppositis profunde tripartitis, laciniis acerosis pungentibus, adultioribus persistentibus rigidissimis, capitulis terminalibus, bracteis calyce longioribus subulatis.

Hab. In convallibus Andium prope Mendozam: alt. 5000 ad 9000 ped.

Habitus fere *Ulicis europeæ* vel *nanæ*, 4–5 pedalis, valde

ramosa. *Color* florum albus vel pallide purpureus. *Corolla* glabra; tubo semiunciali superne inflato calyce dimidio longiore.

This and the following species are remarkable in having the leaves persistent and becoming gradually more and more spinescent, till, at length, from the new leaves springing up from their axils, they form, as it were, stipulary spines.

10. Verbena *erinacea,* (*Gill. et Hook.*); fruticosa, humilis, cæspitosa, foliis densis opposito-connatis acerosis-ciliatis strictis pungentibus demum elongatis spinescentibus, capitulis paucifloris inter folia immersis. (TAB. XLVIII.)

HAB. In summum fere jugum montium "Uspallata," provinciæ Mendozæ: alt. 10,000 ped.

Radix crassa, lignosa. Tota planta spinosissima. *Capitula* sessilia, immersa, bi-triflora, versus apicem ramorum. *Bracteæ* ovato-lanceolatæ, mucronatæ, calyce elongato tubuloso striato, hirsutiusculo, dentibus pungentibus, quadruplo breviores. *Corolla* calyce subdimidio longiore.

Figs. 1, 2, Leaves. *Fig.* 3, Flower and bractea. *Fig.* 4, Stamens. *Fig.* 5, Pistil:—*magnified.*

+ + *Spinæ foliis distinctæ.*

11. Verbena *seriphioides,* (*Gill. et Hook.*); fruticosa, ramulis brevissimis, foliis densissimis connatis ovato-triquetris crassis carinatis superne canaliculatis obtusis glabris, spinis oppositis connatis lato-subulatis subfoliaceis ciliatis demum elongatis rigidissimis integris trifidisve, floribus subsolitariis.

HAB. In provincia meridionali Mendozæ, usque ad flumen "Atuel:" alt. 3000 ped.

Tri-quadripedalis, ramosa; ramis brevibus numerosis. *Folia* vix duas lineas longa, glabra. *Flores* ex apicibus ramulorum. *Bractea* ovata. *Calyx* tubulosus, angulatus. Habitus generis *Seriphii.*

The branches of this curious plant always proceed from

the axils of opposite and connate spines, which are larger than the leaves. At first, indeed, the spines appear to be of nearly the same texture, or they are even more thin, and approaching to membranaceous, especially at the margins, where they are ciliated. They gradually, in age, become longer, narrower, more terete and indurated, yellow, brown, and woody, often bifid. The leaves are never ciliated: in shape they have some similarity to those of *Saxifraga oppositifolia.* The corolla is about half as long again as the calyx, and varies from a white to a lilac colour.

12. Verbena *cæspitosa,* (*Gill. et Hook.*); fruticōsa, ramis brevibus densissime cæspitosis, ramulis brevissimis, foliis connatis oblongis obtusis supra canaliculatis appresso-pilosis, spinis oppositis connatis subulatis rigidis integris, capitulis bifloris.

Hab. In "Paramillo de Uspallata:" alt. 9500 ped. *Gillies et Cruickshanks.—Llareta* Incolarum.

This has the habit of the last species, but with a far more densely compacted habit; the leaves, too, are large and clothed with appressed hairs. Here, as in the *V. seriphioides,* many of the young shoots are wholly clothed with spines, at first green, hairy, and soft, at length becoming rigid, and throwing out from their axils short ramuli, wholly clothed with leaves. The root is very thick and woody. Two flowers are produced together within two connate ciliated concave bracteæ. *Style* swollen at the base, and jointed upon the top of the germen.

13. Verbena *asparagoides,* (*Gill. et Hook.*); foliis fasciculatis lineari-oblongis obtusis pubescentibus majoribus revolutis, spinis tripartitis, capitulis paucifloris, bracteis lanceolatis dentibusque calycinis spinosis, floribus pubescentibus.

Hab. In summum fere jugum "Uspallata:" apud "Cerro del Portezuelo:" alt. 10,000 ped.

Here, too, the spines in a young state have a foliaceous

margin, very narrow indeed, and pubescent, which soon disappears. Leaves a line to a line and a half long.

† † *Inermes; foliis grosse serratis incisis multifidisve.*

14. Verbena *bonariensis;* elata aspera, caule acute tetragono, foliis lanceolatis acutis sessilibus subconnatis venosis grosse serratis, spicis numerosis elongatis, corolla calyce ovato vix dimidio longiore, bracteis subulatis calycem æquantibus.

Verbena bonariensis. *Linn. Sp. Pl. p.* 28. *Dill. Elth. t.* 300. *f.* 387.

Hab. Vulgaris, præcipue in locis cultis. In Bonaria atque Mendoza.

I possess this plant from almost all the warm parts of South America, from the Cape of Good Hope, from the Mauritius, and from New Holland. The flowers are so crowded as to make the spike appear almost cylindrical. The calyx is closed over the fruit, splitting down to the base in one or more places, most readily on each side of the shorter tooth, which often thus constitutes a separate leaflet. The *Verbena littoralis* of Humboldt seems to be a variety of this with shorter spikes than usual.

15. Verbena *intermedia*, (*Gill. et Hook.*); aspera, caule acute tetragono, foliis lanceolatis acutis sessilibus subconnatis venosis grosse serratis, spicis breviusculis, corolla calycem cylindraceum plusquam duplo superante.

Hab. In Provincia Bonariæ, et in Pampas non raro occurrit.

Ubique tactu asperrima. *Folia* rigida, læte atque pallide virens. *Spicæ* paucæ, ternatæ nunc proliferæ, unciam et ultra longæ. *Flores* laxiusculi.

In general aspect the present species approaches the following rather than the preceding. The bracteæ are like those of *V. bonariensis,* but the flowers are very different, far more showy, and of a blueish purple colour. *Calyx* splitting, when the inclosed fruit is ripe, as in the foregoing.

16. Verbena *venosa*, (*Gill. et Hook.*); asperrima, caule acute tetragono, foliis oblongo-lanceolatis sessilibus basi latis subcordatis venosis grosse acutissimeque serratis, spicis subternis brevibus, corollis calyce cylindraceo triplo longioribus, bracteisque duplo longioribus.

Hab. Inter Pampas, Provincia Bonariæ.

Caulis subpedalis, simplex. *Folia* subapproximata, tripollicaria, sessilia sed non connata. *Flores* pulcherrime purpureo-cærulei. *Corollæ tubus* longus, subpilosus, versus medium inflatus. *Fructus* ut in *V. intermedia.*

17. Verbena *chamædrifolia;* caule procumbente piloso, foliis oblongo-lanceolatis grosse serratis calycibusque hispidis, floribus corymbosis, laciniis corollæ omnibus emarginatis. *Lindl.*

Verbena chamædrifolia. *Juss. in Ann. du Mus. v.* 7. *p.* 73. *Spreng. Syst. Veget. v.* 2. *p.* 748.

Verbena veronicifolia. *Sm. in Rees' Cycl.*

Verbena Melindres. *Gillies in Bot. Reg. t.* 1184.

Erinus peruvianus. *Linn. Sp. Pl. p.* 879.

Lychnidea veronicæ folio, flore coccineo. *Feuillée Per. v.* 3. *p.* 36. *t.* 25.

Hab. Per totam planitiem "Pampas" dictam.

This is unquestionably the *Lychnidea veronicæ folio, &c.* of the Abbé Feuillée, in the place above quoted, and consequently the *Erinus peruvianus* of Linn. and the *V. chamædrifolia* of Jussieu. That author's station for the plant is Paraguay. M. Sellow, too, appears to have found it on the north side of the Plata; so that it has probably a very extensive range, and the richness of its flowers must render it a very remarkable object. It is now cultivated by the Horticultural Society, from seeds sent by Dr. Gillies.

Melindres is the vernacular name of this plant in the Pampas, and it is always combined with the word *colorado,* (red.)

18. Verbena *teucrioides,* (*Gill. et Hook.*); ubique hispida,

foliis angustis lanceolatis sessilibus asperrimis dentato-pinnatifidis, spicis oblongis, calycibus elongatis post anthesin tortis.

Hab. Prope summum jugum "Uspallata;" apud "Cerro del Portezuelo:" alt. 10,000 ped.

The leaves in shape resemble those of *V. canescens. Humboldt* (but the flowers are quite different), and are hispid in our plant. The flowers, indeed, are like those of *V. Lamberti Ker*, but the foliage is totally at variance. Corolla twice the length of the very long calyx, yellowish.

19. Verbena *erinoides;* caule ascendente ramoso hirto, foliis tripartito-laciniatis hirsutis, laciniis lineari-lanceolatis subdentatis, spicis axillaribus solitariis laxis, bracteis calycem æquantibus patulis. *Spreng.*

Verbena erinoides. "*Willd. Enum.* 686. 12." *Spreng. Syst. Veget. v.* 2. *p.* 750.

Verbena multifida. *Ruiz et Pav. Fl. Peruv. v.* 1. *p.* 21. *t.* 33. *c.*

Erinus laciniatus. *Linn. Sp. Pl. p.* 879.

Lychnidea Verbenæ tenuifoliæ folio, vulgo Sandia-Laguen. *Feuillée Per. v.* 3. *t.* 25.

Hab. Frequens in provinciis Bonariæ, Mendozæ et Chile, usque ad alt. 8000 ped.

Extremely variable in the relative length and breadth of the leaves: trifid or multifid, the segments narrow and linear, or sometimes ovate and more or less hairy or hispid. The following varieties may be enumerated:

α. foliis ovato-lanceolatis inciso-serratis vix trifidis.

β. foliis profunde trifidis subtripartitisve, laciniis incisis, ultimis ovatis lanceolatisve. (*V. multifida, Ruiz et Pavon, v.* 1. *p.* 22. *t.* 23. *f. c.*)

γ. foliis tripartitis, laciniis inciso-pinnatifidis ultimis lineari-oblongis acutis.

δ. foliis bipinnatifidis, segmentis paucis linearibus elongatis, vel etiam foliorum segmentis angusto-linearibus.

ε. foliis bipinnatifidis, segmentis linearibus brevibus, (bracteis plerumque calyce longioribus. An *species propria?*)

ζ. foliis bipinnatifidis, segmentis brevibus oblongis, (caule prostrato foliis pubescenti-incanis. An *sp. propr.?*)

The figures of Feuillée, and of Ruiz and Pavon above quoted, are very characteristic of many specimens of our plant, but the former author says the flowers are scarlet, the latter that they are purplish flesh colour; whereas, ours are blue. Again, we have specimens which only differ in the leaves being as little cut, or very nearly so, at the margin, as those of *V. chamædrifolia.* Both these plants are taken into the genus *Erinus* by Linnæus, both are called *Melindres* by the Spaniards of South America, (the present one *M. azules.*) From all this it would appear that the colour of the flowers, and the more or less deeply incised leaves, are very variable circumstances. To these, again, is very closely allied *V. Aubletia,* and still more the *V. Lamberti.* Nay, Sir James Smith has in Rees' Cyclopedia given it as his decided opinion that Feuillée's *Lychnidea t.* 25, (the only authority for the *Erinus laciniatus* of *Linn.*) should be referred to *V. Aubletia:* while Mr. Ker, in his Bot. Register, refers it to *V. Lamberti,* (his *V. Aubletia.*)

20. Verbena *crithmifolia,* (*Gill. et Hook.*); scabra herbacea erecta, foliis bipinnatifidis, segmentis linearibus obtusis crassis canaliculatis margine revolutis, spica oblonga densa, capsula acute triquetra.

β. *minor:* foliis angustioribus.

Hab. Inter Mendozam et montes Andium, alt. 3000 ad 6000 ped.:—β. Provincia Sancti Ludovici, alt. 2500 ped.

Tota *planta* scabra, vix hispida. *Folia* crassa, quasi carnosa, profunde divisa in laciniis linearibus. *Bracteæ* etiam lineares. *Calyx* ovato-oblongus, dentibus obtusiusculis. *Corolla* calyce duplo longior, limbo mediocri roseo.

The flowers yield a honey-like smell.

21. Verbena *cuneifolia;* caule erecto hispido, foliis cuneatis 3-fido-laciniatis hirsutiusculis, laciniis lanceolatis serratis, spicis ternis terminalibus oblongis.

Verbena cuneifolia. *Ruiz et Pav. Fl. Peruv. p.* 22. *t.* 32. *f. a. Spreng. Syst. Veget. v.* 2. *p.* 750. (*V. cuneata.*)

Hab. Prope Rio del Diamante. In ascensu Cordillera versus Mendozam spectante, in loco *Punta de las Vacas* dicto: alt. 3000 ad 7500 ped.

22. Verbena *flava,* (*Gill. et Hook.*); foliis lineari-lanceolatis integris pinnatifidisve, glabris, floribus laxe spicatis, calyce elongato pubescente, dentibus valde inæqualibus, bracteis minutis.

Hab. In convallibus Andium, Mendozam versus, et in collibus prope *Rio del Diamante:* alt. 5000 ad 8000 ped.

Species distincta. *Caules* basi procumbentes. *Folia* pinnatifida, glabra, laciniis paucis linearibus, trifidis integrisque in iisdem et in distinctis ramis. *Flores* laxi, intense flavi.

23. Verbena *radicans,* (*Gill. et Hook.*); suffruticosa, caule procumbente inferne radicante, foliis trifidis segmentis plerumque trifidis, laciniis oblongo-linearibus subcarnosis glaberrimis, spicis brevibus subcapitatis, corolla calyce pubescente duplo longiore.

Hab. In convallibus Andium prope Mendozam: alt. 7000 ad 8000 ped.

This has much the habit of *V. microphylla* of Humboldt and Kunth; but the leaves are larger, more divided, wholly glabrous, of a yellowish colour when dry, and the spikes are terminal, not axillary. It is remarkably procumbent, and throws out roots abundantly from the lower part of the woody stems. Flowers fragrant.

24. Verbena *microphylla;* caule suffruticoso repente, foliis tripartitis strigoso-hispidis, laciniis obovato-oblongis, bilobis, intermedia triloba, spicis alaribus, solitariis, capituliformibus. *Kunth.*

Verbena microphylla. *Humb. et Kunth, Nov. Gen. v.* 2. *p.* 220. *tab.* 133.

Hab. In convalle fluminis "Atuel," provincia Mendozæ: alt. 7000 ped.

This is well represented in Humboldt's Nova Genera above quoted. Our plant is indeed more woody, more cæspitose, and smaller in all its parts, owing probably to a different exposure.

LIPPIA.

1. Lippia *nodiflora:* caule subherbaceo prostrato, foliis obovato-cuneatis apicem versus serratis subpubescentibus, capitulis oblongo-rotundatis, bracteis ovato-acuminatis.

β. *minor,* caule suffrutescente, repente, foliis angustioribus, capitulis rotundatis.

Lippia nodiflora. *Mich. Fl. Bor. Am. v.* 2. *p.* 15. *Humb. et Kunth, Nov. Gen. v.* 2. *p.* 213.

Zapania nodiflora. *Pers. Syn. Pl. v.* 2. *p.* 140.

Verbena nodiflora. *Linn. Sp. Pl. p.* 28.

Hab. α. Locis humidis prope Mendozam: alt. 2500 ped.—β. Ad ripas fluminis "Saladillo," in provincia "Cordova."

Our *Var.* β. comes very near the *Lippia reptans* of Humboldt and Kunth, but differs in the rounded, not oblongo-cylindrical, heads of flowers. I fear, however, it can only be considered a dwarf state of *L. nodiflora,* though at first sight it appears almost entitled to rank as a distinct species. The cells of the anthers of the two uppermost stamens of this species are not placed parallel, but one is inserted higher up, and has a sort of membranous appendage or crest attached to it. The Calyx is oval and compressed, especially on one side, distinctly bifid, at length enclosing the two semiterete nuts, which are placed face to face, and easily separated.

2. Lippia *asperifolia;* suffruticosa erecta, foliis lanceolatis serratis appresso-pilosis scabris subsessilibus venis dis-

tinctis, capitulis brevi-pedunculatis, bracteis late ovatis brevi-acuminatis.

Lippia asperifolia. *Rich. Cat. Hort. Med. Par. p.* 67. *Humb. et Kunth, Nov. Gen. v.* 2. *p.* 214. *Spreng. Syst. Veget. v.* 2. *p.* 751.

Zapania lantanoides. *Lam. Ill. v.* 2. *p.* 140.

Zapania odorata. *Pers. Syn. Pl. v. p.* 140.

Verbena globulifera. *Herit. Stirp. v.* 1. *p.* 23. *t.* 12. *Willd. Sp. Pl. v.* 1. *p.* 116.

HAB. Copiose in planitiis australibus Provinciæ "Cordova."

Caulis erectus, basi fruticosus. *Planta* tota aspera, fragrans. *Fructus* subrotundo-compressus, maturitate stylo terminatus.

PRIVA.

1. Priva *lævis;* herbacea glabra, foliis oppositis ovatis dentatis basi cuneatis petiolatis, fructu calyce ampliato nudo tecto.

Priva lævis. *Juss. in Ann. du Mus. v.* 7. *p.* 70.

Castelia cuneato-ovata. *Cavan. Icon. v.* 6. *p.* 61. *t.* 583.

HAB. Circa Mendozam, ad vias: et in Provincia Cordovæ: alt. 1000 ad 2500 ped.

This plant, so well figured and described by Cavanilles, as a new genus, (*Castelia*,) has been referred to the genus *Priva* by Jussieu, and perhaps with justice. In habit it is not very dissimilar, but the calyx, though it becomes enlarged in proportion as the fruit increases in size, is never inflated, and it is always naked, free from setæ. Flowers fragrant. Roots tuberous, whence the vernacular name "*Papilla.*"

WILSONIA. (*nov. gen.*) (TAB. XLIX.)

GEN. CHAR. *Cal.* 5-dentatus, tubulosus, dente anteriore majore, demum hinc longitudinaliter fissus. *Corolla* tubo cylindraceo, limbo 5-fido, inæquali. *Stamina* 4, didynama, fertilia. *Stigma* laterale. *Drupa* sicca: *Nuces* duæ, biloculares, dispermæ, primum arcte cohærentes, demum solutæ.

1. Wilsonia *glaberrima*, (*Gill. et. Hook.*); (Tab. XLIX.)

Hab. In convallibus Andium, prope Mendozam: alt. 5000 ad 6000 ped.

Frutex erectus, rigidus, subvirgatus, ubique glaberrimus. *Ramuli* subspinescentes. *Folia*, præcipue in ramis junioribus, sæpe fasciculata, alterna, parva, oblongo-spathulata, crassiuscula, subcarnosa, obtusa, uninervia, sessilia. *Flores* terminales, in spicam laxiusculam congesti, bracteati, odorati. *Bracteæ* inferiores foliiformes, *supremæ* lineares, calyce breviores. *Calyx* brevissime pedicellatus, oblongo-cylindraceus, 5-dentatus, parvus, dente unico (exteriore) longiore. *Corolla* calyce quadruplo longior. *Tubus* cylindraceus, superne incrassatus. *Germen* ovatus, basi glandula carnosa cinctum. *Stylus* filiformis, tubo corollæ longior. *Stigma* dilatatum, obliquum, seu laterale. *Fructus: Drupa* ovalis, siccitate nigra, basi calyce hinc fisso circumdata, utrinque longitudinaliter sulcata, demum in duas nuces, plano-convexas, biloculares, dispermas, facile solutæ.

This has the habit of some species of *Verbena*, with a calyx of a similar structure to them, breaking down on one side as the fruit advances to maturity; but the fruit itself is altogether that of *Priva*, from which it differs in its whole habit, in the small calyx, and especially in the woody stems and branches.

I have named it in compliment to Wm. Wilson, Esq. of Warrington, whose unwearied exertions in the cause of botany, and acute researches into the structure of the minuter parts of vegetables, justly entitle him to such a mark of distinction.

Among the Verbenas, the species most nearly allied to this is *V. aspera* of the present memoir, which has fasciculated and alternate leaves. But that has a fruit of four nuts, as in the rest of its genus.—The evanescent pericarp in this and in *Priva lævis*, and in many *Verbenæ*, I have in vain searched for.

[TAB. L.]

ON MACRÆA, A NEW GENUS OF PLANTS FROM CHILE.

After the excellent Memoir of Mr. Lindley on the present genus, published in Brande's Journal of Science, v. 25. p. 104, I should not have thought of presenting any farther observations, only that I have for a long time had the plate engraved, and the description of two species of the genus (*Xeropetalon MSS.*) ready for publication. Circumstances, over which I had no control, prevented their appearance, and now I should scarcely have thought them worthy of meeting the public eye, were it not that a figure of the genus is still a desideratum, and that I have been more fortunate than Mr. Lindley in possessing perfect fruit.

My first knowledge of the plant was derived from Mr. Lindley himself, who kindly gave me a specimen from his Herbarium, as a genus allied to *Frankenia*. That author, in the Memoir above quoted, has alluded to its affinity with *Frankeniaceæ*, and has pointed out the differences in the structure of the ribs of the calyx. In examining this, and other species which I have since received from the Horticultural Society, and from Mr. Cruickshanks of Valparaiso, Mr. Arnott and myself were forcibly struck with their similarity in many points to the *Caryophylleæ* and *Cistineæ*, as well as the *Lineæ*. From all of these *Macræa* differs in its monophyllous calyx, and in the nature, and especially the dehiscence, of the capsule, and from the latter more particularly in the curved embryo.

There is another point of resemblance to which Mr. Lindley has alluded, namely, its affinity with the *Geraniaceæ*. He observes, "If we can understand the axis of the capsule of *Macræa* to be an elongated torus, we have then a fruit of a sufficiently similar structure to be compared to that of *Geraniaceæ*, *Rutaceæ*, and other neighbouring tribes." Still I must confess that the habit of our plants is so entirely at variance with the *Geraniaceæ*, as are the monophyllous calyx,

the dry membranaceous nature of the petals, and the strait (never convoluted or plicate) cotyledons of the embryo, that to unite the two would hardly be consistent with the object of a natural arrangement. *Macræa* probably forms a distinct order from any hitherto known, and Chile may yet soon produce other novelties allied to this which will better enable us to refer it to its right place in the system.

Mr. Lindley considers the stamens to be inserted upon a short torus. To me they appear perfectly hypogynous: and, immediately at the base of each alternate stamen, and alternating with the petals, I find a small fleshy pubescent scale or gland. These are so small, however, that their real structure is not to be seen without much difficulty.

Generic Character.

Macræa. *Lindl.* *Cal.* inferus, monophyllus, campanulatus decemcostatus, angulatus, 5 dentatus, dentibus marginatis. *Petala* 5, hypogyna, obovata, unguiculata, scariosa, persistens. *Stam.* 10, hypogyna, basi 5–glandulosa. *Filamenta* filiformia. *Antheræ* oblongæ, basi insertæ, biloculares, longitudinaliter dehiscentes. *Germen* ovale, trilobum. *Stylus* perbrevis. *Stigmata* 3, linearia, dorso sulcata. *Capsula* subrotundo-ovalis, 3–loba, trilocularis, semitrivalvis, valvis loculicidis. *Locula* disperma. *Semina* 2 in singulo loculo, receptaculo parvo versus medium axeos inserta, altero ascendente, altero suspenso, globosa, subangulata, fusca. *Albumen* carnosum, album, copiosum. *Embryo* filiformis, curvatus. *Cotyledones* angustæ. *Radicula* elongata, ad hilum seminis versa.

Suffrutices *aridæ.* Rami *oppositi.* Folia *opposita, brevissime petiolata, ovata, integerrima vel crenata, pubescentia, subtus niveo-tomentosa.* Paniculæ *terminales, dichotomæ, breves.*

1. Macræa *grandifolia ;* foliis subtus griseis glandulosis, venis prominentibus, ramis pubescentibus, pedunculis folio brevioribus. *Lindl.*

Macræa grandifolia. *Lindl. in Brande's Journ. v.* 25. *p.* 204.

Hab. Sponte crescentem juxta vicum Colina, urbis Santiago

finitimum legit *Macrae.* 1825.—In Andibus Chilensibus in valle "del Fray Carlos," prope radices montis ignivomi "Peteroa;" alt. 7500 ped. *Gillies.*

Folia 8 lineas longa, plerumque integerrima, nunc obscure serrata, subtus minus tomentoso-nivea quam in reliquis.

Most of my specimens of this species are derived from the same source as Mr. Lindley's, and I am indebted for them to the liberality of the Horticultural Society.

2. Macræa *parvifolia;* foliis subtus niveis venis obscuris, ramis arachnoideis pedunculis folio brevioribus. *Lindl.*

Macræa parvifolia. *Lindl. in Brande's Journ. v.* 25. *p.* 204.

Hab. Cum precedente legit *Macrae.*

3. Macræa *rosea;* foliis (integerrimis) distantibus subtus niveis eglandulosis, ramis pubescentibus, pedunculis elongatis. *Lindl.* (Tab. L.)

Macræa rosea. *Lindl. in Brande's Journ. v.* 25. *p.* 204.

Hab. Ad Cumbre, Andium claustrum, Novembre floridam legit *Macrae.* In Chile, a Guardia usque ad Primera Quebrada. *D. Cruickshanks.*—In summum fere montis altissimi Chilensis, "San Pedro Nolasco" dicti. *Gillies.*

Frutex, ut videtur, parvus, pedalis et ultra, erectus vel subdecumbens, ramis oppositis, vetustioribus glabris, fuscis nitidis; junioribus gracilibus tereti-filiformibus, pubescentibus. *Folia* opposita, remotiuscula, ovata, brevissime petiolata, patentia vel reflexa, integerrima, oblique nervosa, superne atroviridia, appresse pubescenti-pilosa, subtus niveo-tomentosa, marginibus planis. *Paniculæ* breves, terminales, bis-terve di-trichotomæ. *Pedunculi* pedicellive basi bibracteati; bracteis inferioribus foliiformibus; superioribus minutis, lanceolatis. *Calyx* pubescens, ore paululum contractus, basi abrupte constrictus. *Corolla* rosea, longe unguiculata, venosa, venis intra marginem unitis.

Fig. 1, Calyx. *Fig.* 2, Petal. *Fig.* 3, Stamens, with the accompanying gland. *Fig.* 4, Pistil. *Fig.* 5, Style and

stigmas. *Fig.* 6, Capsule. *Fig.* 7, Section of do. *Fig.* 8, Valve of the capsule, showing the attachment of the seeds, and the central axis partly free. *Fig.* 9, Seed. *Fig.* 10, Section of the seed to show the embryo:—all more or less *magnified.*

4. Macræa *crenata;* foliis profunde crenatis marginibus reflexis subtus niveo-tomentosis, floribus subcorymbosis, (petalis albis.)

Hab. Cum priore. *D. Cruickshanks.* In Andibus Chilensibus prope "La Guardia" in valle fluminis Aconcagua: alt. 5000 ped. *Gillies.*

Until after the publication of Mr. Lindley's Memoir, I was only acquainted with the present and foregoing species: the former having the leaves quite entire, the margins plane, the flowers of a beautiful rose-colour; the latter having deeply crenate leaves, with the margins revolute, the petals white. But I am fearful that these characters may not be constant, and I am equally in doubt with regard to the characters of the rest of the genus. The glands, extremely minute in themselves, are very variable on different individuals and even on different leaves of the same specimen. The quantity of pubescence on the under side of the leaf is scarcely to be relied on, and thus the nerves beneath become more or less conspicuous. The length of the peduncles and colour of the flowers I fear cannot much be depended upon. All might, probably, without violation to nature, be referred to varieties of the same species.

The genus is deservedly named in compliment to Mr. James Macrae, who made valuable collections for the Horticultural Society both in the Brazils, at the Sandwich Islands and in Chile; and who is now entrusted with the charge of the Botanic Garden at Ceylon.

SKETCH OF A JOURNEY

TO THE ROCKY MOUNTAINS AND TO THE COLUMBIA RIVER IN NORTH AMERICA:

By THOMAS DRUMMOND, *Assistant Naturalist to the second Land Arctic Expedition, under the command of Captain Sir John Franklin, R. N.*

[IT is scarcely necessary to preface the following journal of an excursion through a country hitherto unknown to the Naturalist with any observation, further than to say, that it embraces the period of time when Mr. Drummond quitted Sir John Franklin, Dr. Richardson, and the other officers of the Expedition, at Cumberland House, to that of his rejoining them at the same place.—ED.]

CUMBERLAND HOUSE, of which the latitude is 53° 56′ 40″ N., longitude 102° 16′ 41″ W., is situated upon a small island, called Pine Island, formed by the branching of the Saskatchawan, which divides into two channels, just before its junction with a lake, called Pine Island Lake. In times of high water, occasioned by the melting of the snow upon the mountains where it takes its rise, the river runs into the lake by the upper channel, and empties itself by the lower. During the time which elapsed between my arrival at Cumberland House, on the 28th of June, and the 10th of August, when the waters began to fall, the lake had risen six feet perpendicular, reducing the island, which is naturally low, to a very small compass, and destroying the corn which grew immediately around the fort. This was a very unusual circumstance, and I found, when afterwards ascending the Saskatchawan, that the waters had attained to upwards of twenty feet above their winter level. The country in the neighbourhood of Cumberland House is limestone, similar to that described by Dr. Richardson in the vicinity of Lake Winnipeg.

The following list comprises some of the plants which I collected during my stay at Cumberland House, but it cannot be considered as a full enumeration, since many of the spring flowers were past, and a still greater number must have escaped my memory:—*Hippuris vulgaris, Utricularia vulgaris* and *media, Veronica peregrina and scutellata,* a species of *Lycopus?* 2 species of *Scirpus,* a species of *Eriophorum,*

Alopecurus aristulatus, Phleum pratense, Alopecurus sp., a *Poa* resembling *P. distans* and *P. annua, Loliun perenne,* introduced? *Bromus* sp.? *Triticum* sp., *Elymus mollis* and another species, *Hordeum jubatum, Arundo colorata, A. phragmites, A. canadensis,* &c. with many other *Gramineæ. Galium septentrionale,* and 2 other species, *Potamogeton pectinatum, P. lucens, P. fluitans,* and 2 others. *Pulmonaria paniculata, Myosotis Lappula,* and another species, *Lysimachia thyrsiflora* and. *L. ciliata, Apocynum androsæmifolium* and *A. cannabinum, Campanula rotundifolia, Lonicera flava? Diervilla cærulea, Symphoria racemosa,* and another species or variety, *Viola debilis* and *V. canadensis, Swertia difformis?* a *Gentiana,* with the habit of *G. Campestris,* 4 or 5 species of *Chenopodium, Pastinaca sativa,* perhaps naturalized, and several other *Umbelliferæ,* of one of which the Indians eat the roots. *Viburnum edule* and *V. oycoccos, Parnassia palustris, Drosera rotundifolia, Linnæa borealis, Cornus alba,* and *C. canadensis,* a species of *Allium, Convallaria bifolia, Acorus Calamus, Juncus bufonius,* and *J. gracilis,* &c., several species of *Rumex, Alisma Plantago, Vaccinium Vitis Idæa,* and *V. Oycoccos, Polygonum amphibium, P. Persicaria, P. Convolvulus* and *P. aviculare, Monotropa uniflora, Pyrola secunda, P. elliptica,* with the flowers, pure, white, and very fragrant, *P. chlorantha* and *P. rotundifolia,* the latter differing from the British species in having rose-coloured blossoms, *Andromeda polifolia, Arbutus Uva ursi, Saxifraga tricuspidata, Mitella nuda, Stellaria lateriflora,* &c. *Aronia ovalis,* a species of *Prunus,* resembling *P. Cerasus, Spiræa salicifolia,* 3 varieties of *Rose,* a *Rubus,* resembling *R. Idæus, R. triflorus, Chamæmorus,* and *R. pistillaris, Fragaria canadensis* and *F. Vesca, Potentilla norvegica?* also a species with quinate and another with pinnate leaves, *Potentilla anserina, Geum strictum, Comarum palustre, Actæa americana,* a *Nuphar* similar to *N. lutea, Aquilegia canadensis, Anemone dichotoma* and *A. multifida, Ranunculus Purshii, R. fluviatilis, R. sceleratus,* and several other species, *Mentha canadensis, Scutellaria galericulata, Dracocephalum virginicum* and *D. parviflorum,* a species of *Melampyrum, Lepidium virginicum, Erysimum cheiranthoides?*

Sisymbrium canescens and *S. brachycarpum*, *Geranium carolinianum*, *Fumaria aurea*, *Lathyrus palustris* and another species, *Vicia canadensis* and *V. pisiformis*, an *Astragalus*, resembling *A. glycyphyllos*, *Hieracium sabaudum*, *Sonchus oleraceus* and 2 other species, a species of *Cnicus*, of which I obtained no specimens, the inundation having destroyed them all before their time of flowering. *Verbesina alata?* with large yellow blossoms, a species of *Senecio* and another of *Bidens*, *Leontodon palustre*, *Gnaphalium* like *G. dioicum*, *Artemisia biennis*, several kinds of *Erigeron*, *Solidago multiradiata* and several others, many species of *Aster*, a *Tussilago*, *Achillea Millefolium* and another species. Pursh considers the *A. Millefolium* to be a naturalized plant, but this is certainly not the case, for it is frequently found near the summits of the Rocky Mountains. Of *Orchis* there are several kinds, *Corallorhiza innata*, *Cypripedium pubescens*, *Sparganium ramosum*, and *S. simplex*, *Carex Pseudo-Cyperus*, *C. filiformis*, *C. teretiuscula* and several others. *Typha latifolia*, *Urtica urens?* *Myriophyllum spicatum*, *Ceratophyllum demersum*, *Sagittaria sagittifolia*, *Calla palustris*, *Festuca fluitans*. *Uvularia puberula*, a species of *Impatiens?* *Epilobium angustifolium* and many others, a *Ribes* like *rubrum*, another with black hispid fruit, 2 species with black smooth fruit, and one resembling the *gooseberry*. *Lemna minor*, *L. trisulca*, *L. minor*, and *L. gibba*, *Equisetum palustre*, *E. arvense*, *E. sylvaticum*, and a species smaller than *E. variegatum*, *&c.* The only moss that I added to my collection here was *Bryum triquetrum*, found abundantly in the swamps. The following trees grow in this neighbourhood: *Pinus alba*, *P. nigra*, and *P. microcarpa*, *Populus trepida*, and the rough-barked species, *Populus balsamina*, *Betula papyracea* and *B. glandulosa*, the latter is small and confined to the swamps; with a few species of *Willows*. There is also a species of *Fraxinus*, sparingly met with on the banks of the river Saskatchawan, and a species of *Elm*. This place may be considered as the highest northern limit of the genera *Ulmus* and *Fraxinus*.

The birds which I observed here offer comparatively little worthy of remark. The *Passenger Pigeon* is very common,

building its nest in the willow bushes on the margins of the lake, and feeding principally at this season upon the berries of *Cornus alba* and *C. canadensis*. A species of *Caprimulgus* is also common here and throughout all the country from Canada to the Rocky Mountains. It is called *Peesqua* by the natives, because its note consists of this word, which it repeats almost incessantly during the fine summer evenings, when it soars so high as to be almost imperceptible. In windy weather it flies lower, in pursuit of its food, probably insects, and it may then be sometimes taken, though this is always difficult, on account of the irregularity of its movements. It makes its nest, which much resembles that of the *common lapwing*, on the ground, and lays three or four eggs of a dirty brown, marked with darker coloured spots. I often met with it on the plains of the Saskatchawan, in the beginning of July.

The insects are not numerous: I observed *Papilio Atalanta*, *P. Urticæ*, and *P. Comma-album*, and *P. Cardui*; also a species much resembling *P. Cardaminis*, but the sexes exactly similar, the male insect wanting the orange spot upon the wings; also another species, pure white, resembling *P. Napi*, and a large purple one with a white border; a large yellow butterfly of the swallow-tail kind, with black clouds and streaks; and a smaller yellow one, resembling *P. Rhamni*. In *Coleoptera*, the genera *Buprestis* and *Cerambyx* are numerous on the picquets of the fort: but many of the most common British genera are almost wanting, such as *Curculio*, *Scarabæus*, and *Staphylina*. The *Mosquitoes* are more plentiful here than I saw them anywhere else.

The country round Cumberland House is very flat and marshy. The only rising ground of any considerable elevation visible from it is the Basqua Hill, said to be about 40 or 50 miles distant. It was visited by the late Lieutenant Hood during the winter which that Expedition passed at Cumberland House, and from the information which the Indians gave me of the numerous plants that grow there exclusively, I regretted very much that it was not in my power to explore it.

The company's boats having arrived about the 20th of August, I left this place for Carlton House. On arriving at that post, Sept. 1st, the Indians were found to be in so unsettled a state, that it would have been very unsafe to make excursions in that neighbourhood, without the protection of a strong party; and I therefore decided upon proceeding with the brigade, until I should find a place better suited to my purpose. In ascending the river, the banks became gradually more elevated, seldom, however, precipitous, but rising gradually with broken undulating ground, sometimes for the space of a mile, before reaching the level of the surrounding country, which, at the junction of the south branch, may be estimated at from 150 to 200 feet above the bed of the river. This place may be considered as the commencement of those extensive plains which reach from hence to the Rocky Mountains, a distance of at least 700 or 800 miles, and, according to Indian information, are prolonged as far south as Mexico. The district is appropriately named by the Canadian Voyageurs, *la grande Prairie.* The woods which partially cover the country immediately contiguous to Carlton House, disappear at a distance of about 20 miles to the westward. The soil is generally sandy, and the vegetation becomes of a different and peculiar aspect, the tribe of *Papilionaceæ* prevailing to a considerable degree, and the genera *Phlox, Liatris, Malva,* and *Eriogonum.* Here I first observed a *Psoralea,* nearly allied to *P. esculenta* of Pursh, its roots, like that species, affording to the poor natives, in times of scarcity, a miserable substitute for animal food. The roots somewhat resemble those of the *Dahlia,* and the Indians are very expert at digging them up with a forked stick, which they use in the manner of a lever. They sometimes also eat the roots of a species of *Hedysarum,* the plant probably mentioned by Sir Alexander M'Kenzie under the appellation of *Liquorice.* Two or three kinds of *Umbelliferæ* and *Asclepiadeæ,* which I found nowhere else in my route, grew in this neighbourhood, also 5 or 6 species of *Phascum.**

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* A genus of Mosses scarcely known hitherto as natives of America.

The plan I pursued for collecting was as follows. When the boats stopped to breakfast, I immediately went on shore with my vasculum, proceeding along the banks of the river, and making short excursions into the interior, taking care, however, to join the boats, if possible, at their encampment for the night. After supper, I commenced laying down the plants gathered in the day's excursion, changed and dried the papers of those collected previously; which operation generally occupied me till daybreak, when the boats started. I then went on board and slept till the breakfast hour, when I landed and proceeded as before. Thus I continued daily until we reached Edmonton House, a distance of about 400 miles, the vegetation having preserved much the same character all the way.

The *Aronia ovalis* is not uncommon about Carlton House, and its fruit is eaten by the natives, mixed with their pemmican, while they prefer the wood which it affords to every other kind for making their arrows. The species of *Prunus*, *Bird-Cherry*, or *Choke-Cherry*, is also frequently met with; and its fruit, when fully ripe, is not disagreeable. I found the fruit of the *Viburnum edule* to be very efficacious in allaying thirst. Several interesting animals of the deer kind occur in this vicinity. One of them, called by the traders the *short-tailed Jumping Deer*, is a creature about the size of a fallow deer. It has hair of a beautiful silvery grey colour. I killed a fine specimen of this animal on my journey to Carlton House, in the spring of 1827, but was under the painful necessity of using its skin, after having carried it 15 days, for food. It was a male, and had at that time (the middle of March,) shed its horns. There is another species, called in this country the *long-tailed Jumping Deer*, probably the *Mule Deer* of Lewis and Clarke, but it did not come under my own observation. The *prong-horned Antelope*, described by Dr. Richardson, in Captain Franklin's first Expedition, is a very beautiful little animal, of about the size and general appearance of the roebuck. It is considered the swiftest inhabitant of the plains. These creatures arrive in the neighbourhood of Carlton House about the end of April. They bring forth their young in May,

producing two at a birth, and are said to migrate to the south during the winter. The *Hare* of the plains is of very rare occurrence: in size it rather exceeds the British hare, and turns white during the winter. I killed a specimen of it on my journey to Edmonton House, in the autumn of 1825; it was a female, and giving suck at that time, (the middle of September,) and was of a much lighter grey than the English animal. Not being aware of the scarcity of this creature, and indeed confounding it with the common hare, I took but little care of its skin, which was lost in consequence.

Another very interesting animal is the *Badger* of the plains. Its general appearance resembles the European species, but it is not so large. These creatures burrow in the open plains, making their holes perpendicular at the entrance, which, when concealed by the growth of the grass, prove very troublesome to the pedestrian and dangerous to the mounted hunter, whose horse at full speed is often thrown by them, to the no small risk of the rider's neck. The badgers are very dexterous at concealing themselves in their burrows, and it is difficult to dig them out. We adopted the plan of filling their holes with water, which forced the animals to come out, when we secured them easily. The same method proved successful for catching the ground squirrels, but it is not likely that it would answer equally well when the earth is thoroughly thawed, as the water would then drain off, and the little creatures would dig deeper and deeper, throwing up the earth behind them, which would prevent the water from reaching them. The *Badgers* appear to be partly carnivorous, living on mice and ground squirrels, which their claws are admirably adapted for digging up.

The *Small Wolf*, or *Prairie Dog*, is a very common inhabitant of the plains. Its size is intermediate between the common wolf and the fox. Like the former of these animals, the *Prairie Dogs* hunt in packs of from 3 to 50 and more, and thus, from their number, they become an overmatch for the largest animals of the country; they are also so impudent that they will venture within a few yards of the hunter, and

carry away the game he may have killed, though a fire be lighted for its protection. I procured specimens of this animal at Carlton, in the spring of 1827.

There is another small species of *Fox* found in the plains, which the traders call the *Kit Fox*, it is the smallest of the genus that I have ever seen. The traders furnished us with skins of it, but it did not fall under my observation in a living state.

The different species of *Arctomys*, or *Ground Squirrel*, have been already described by Dr. Richardson. Three of them are found in the vicinity of Carlton House: they are the *Arctomys Franklinii*, *A. Richardsoni*, and *A. Hoodii*. All are lively and beautiful animals. The former, when pursued by dogs, will sometimes climb up a tree, but it is an unwieldy creature in such circumstances, when compared with the *Hudson's Bay Squirrel*, which it somewhat resembles.

The birds most worthy of notice are the *Tetrao Phasianellus*, the *Pheasant* of the traders, or *Pin-tailed Grous*: these abound on the plains. They are about as big as the British grous, of a much lighter colour, and having two of the tail feathers projecting about two inches beyond the rest, whence the name is derived. In habit, these birds resemble the common grous, they make their nests on the ground, laying from five to ten or a dozen eggs, which are like those of a partridge. They keep in families until winter, when they congregate in large coveys. At pairing time, which is the month of May, the *Pin-tailed Grous* select some little eminence, to which they resort at daybreak in great numbers, jumping, running round each other, chuckling, and performing many curious manœuvres; and this they continue to do for several weeks, until the ground is worn quite bare, when they separate in pairs for the season. Their flesh is well-flavoured, and the sportsman would find excellent amusement in following them.

Among the numerous species of *Duck* that frequent the lakes of the plain, may be particularised the *Ruddy Duck*, remarkable for the brilliant blue colour of the bill of the male, and the singular way in which, when courting or

caressing the female, it carries its tail, which is perfectly upright, giving the bird, at a little distance, the appearance of having two heads. It seems to breed in the neighbourhood of Carlton, as I killed a pair of them in the beginning of June, the female having eggs in her body ready for exclusion. Their plumage is remarkably thick and glossy, as that of the *Grebes*, and, like these birds when pursued or frightened, the ducks dive, and show only their bills above water.

The *Bittern* is frequently seen in the marshes about Carlton House; its habits are the same as those of the British species, and it possesses the same singular cry. The sound is very deceptive, frequently appearing as if quite near when really a mile distant. The *Bitterns* appear to have the power of inflating their necks and windpipes to a large size, and I feel no doubt that to this property alone they owe the extraordinary booming noise which they make.

There is also a species of *Curvirostra* common in the lakes of the plains, near which they breed. On approaching their haunts, they fly to meet you, giving, at the same time, the note of alarm to the rest, who immediately join, as if to chase away the intruder, by which means they are easily shot. The American *Curlew*, and several other species of that genus, have the same habit, as well as the *Lapwing* of our own country.

A beautiful little bird, *Phalaropus Wilsoni*, also inhabits those lakes. I procured several specimens about the middle of May, 1827. They swim with great ease, but generally frequent the shallow water.

There is also another small bird that deserves to be noticed for the courage with which it attacks all others that venture near its residence; it is a species of *Flycatcher*, about the size of a lark, and it is truly amusing to see it assault the *Falco borealis*, or any other large bird. It soars above them, then darting down on the back of the opponent, applies its beak, with all the strength that it possesses, to its head, sometimes remaining in this position for a minute or more, and then it returns in triumph to its station, on the top of

some neighbouring bush or small tree, where it resumes the occupation of watching for flies.

Many small birds are also seen here in their passage to more northerly regions, such as the *Emberiza nivalis*, *E. laponica*, &c. The large snowy owl is also met with, and a small brown species, called by the natives the *Beaver Owl;* but why so designated, I could not learn. I observed one of their nests near Carlton House, built on the ground among the bushes, containing two young ones, in the end of May.

Several *Lepidopteræ* occurred in these districts, which I did not meet with in any other situations; but as their names are unknown to me, I cannot particularize them. The tribe of *Coleoptera* is scarce, which may, in some measure, be owing to the grass of the prairies being frequently set on fire. Amongst them I remarked a curious species of *Cicindela*, almost white, with a slight shade of a darker colour on the margin of each elytra; it inhabits sandy spots near the South Branch River. The following Mosses, and these only, were seen in the vicinity of Carlton House. *Phascum cuspidatum*, var. 2; *P. muticum*, *P. serratum*, *P. subexsertum*, and *P. crispum*. *Gymnostomum tetragonum*, *G. latifolium*, *G. ovatum*, *G. phascoides*, and *G. subsessile*, &c. I have already mentioned that there is little or no difference perceptible between the nature and productions of the country that lies between Carlton House and Edmonton. It is difficult to account for these plains being almost destitute of wood; but it may partly be owing to repeated conflagrations, which lay waste the land to a great extent, no deep ravines, extensive swamps, or elevated ground intervening to check the progress of the flames. Thus much is certain, that the vicinity of Edmonton House, for many miles round, was, twenty or thirty years ago, covered with trees, but by being frequently set on fire, it has become exactly similar to the rest.

There are few, if any, rocks visible from the banks of the river, between Cumberland and Edmonton, so that I am unable to decide where the junction takes place between the sandstone and limestone districts; probably it is where the

country begins to rise, before reaching the place where the South Branch River meets the Saskatchawan. Sandstone appears to prevail around Edmonton; it contains thin strata of coal, which is found to burn well, and is employed in the forge for working the iron necessary in boat-building.

The distance between the junction of the South Branch River with the Saskatchawan, and the Rocky Mountains House, may be estimated at from 700 to 800 miles. At Edmonton House, the brigade for the Columbia left the Saskatchawan, making a portage of 100 miles to the Red-Deer River, which falls into the Athabasca Lake; and as I still adhered to my resolution of accompanying it, I found it necessary to reduce my luggage into as small a compass as possible, and therefore left my specimens under the charge of the gentlemen at Edmonton House, only carrying with me a small stock of linen and a bale of paper.

The second day, after leaving Edmonton House, brought us to the commencement of the woody country, which continues all the way to the Rocky Mountains. The trees consist of *Populus balsamifera* and *P. trepida;* the *White Spruce Fir* and the *Birch*, with *Pinus Banksiana* occasionally in the drier situations, and then, more rarely, the *Balsam Poplar*. These are the only trees which occur north of this latitude, though in some localities, and in deep swamps, the *Pinus nigra* and *P. microcarpa* may occasionally be seen. Almost the only plants which we remarked as peculiar to this district, were a species of *Delphinium*, allied to *D. elatum*, and a curious aquatic, resembling in habit the *Hydrocharis Morsus Ranæ*, of which I gathered no specimens at the time, for it was out of flower, and I never saw it again.

We crossed the Portage in six days, without meeting with any serious accident. The horse, however, which carried my bale of paper, unluckily fell down in crossing Papina River, by which the plants were thoroughly soaked; and as the speed with which the brigade proceeded precluded all hope of getting them dried by the way, I found myself unwillingly compelled to carry them on in a damp state, until we reached Fort Assinaboyne, a small establishment belonging to the Company upon

Red-Deer River, where we spent two or three days preparing the canoes and cargo for our ascent of the river to the mountains. The Red-Deer River, on which this Fort is situated, is probably one of the most southern streams which empties its waters into the Frozen Ocean. The whole distance from Fort Assinaboyne to the Rocky Mountains, following the general course of the river, which runs in a nearly due west direction, may be estimated at about 200 miles. The country is thickly wooded with the same species of trees as were mentioned before; the *Pinus Banksiana* and *Populus balsamifera*, however, becoming much more frequent.

It was now ascertained that the canoes were so heavily laden, that it would be necessary for some of the party to go by land, and I gladly agreed to be one of these, in order to have the opportunity of seeing the country, and judging of its probable productions. We quitted the Fort accordingly, on the 1st or 2d of October, and started in high spirits for a journey on horseback. A heavy fall of snow, however, which took place on the 4th, put a final period to collecting for this season; it also rendered our progress through these trackless woods very unpleasant, our horses becoming soon jaded, when the only alternative was to walk, and drive them before us. To add to these misfortunes, the poor animals were continually sinking in the swamps, from which we found it no easy task to extricate them. The Red-Deer River is very rapid, so that its rise must be considerable, though not discernible when travelling through the woods which skirt it. The general appearance of the country is flat, intersected with lakes and swamps, and occasionally broken undulating ground. The weather during this part of our journey, proved very unfavourable; snow and a thick fog prevented my making much observation on the vegetation, which, however, appeared to bear the same character until we approached the mountains. It also forbade my getting any view whatever of the Rocky Mountains, until we actually reached them. We arrived at Jasper's House on the eleventh day, having travelled a distance of 200 miles since we quitted Assinaboyne Fort, under disadvantageous

circumstances; but all the party were in good health, and we were joined by the canoes on the day following. Jasper's Lake may be considered as the entrance to the Rocky Mountains. It is about 8 or 9 miles in length, and 2 or 3 in breadth, being, in fact, merely an expansion of the Red-Deer River. The Hudson's Bay Company have built a hut here for the accommodation of the person who takes charge of their horses, which are used for crossing the Portage to the Columbia; but the boats, after discharging part of their cargo at the head of the lake, proceed about 50 miles farther up the river, where the Portage commences, to the Upper House. The kindness of Lieut. Simpson, R. N., who was at this time employed in surveying the country, gave me the opportunity of ascertaining the latitude of the commencement and termination of the Rocky Mountains Portage. Jasper's House, or the beginning of the mountains, is in 53° 18′ 40″ north latitude, 117° 38′ 36″ west longitude. The commencement of the Portage 52° 43′ 10″ north, 117° 54′ 46″ west; the travelling distance he estimates at 54 miles. The latitude of the west end of the Portage, at the Columbia, is 52° 7′ 10″, longitude 118° 22′ 30″, and he calculates the travelling distance at 97 miles.

The height of one of the mountains, taken from the commencement of the Portage, Lieut. Simpson reckons at 5,900 feet above its apparent base, and he thinks that the altitude of the Rocky Mountains may be stated at about 16,000 feet above the level of the sea. The first indication which the vegetation afforded of our approach to the mountains, was the *Arbutus alpina* and *Dryas Drummondii;* the latter, with a beautiful yellow flower, was growing upon the gravelly battures formed by one of the mountain rivulets: *Dryas tenella* was also there, and an *Eriogonum* of considerable beauty. I also observed *Splachnum angustatum* and *S. mnioides*, growing commonly on the animal tracks in the woods, principally on the dung of the wolf or fox. I afterwards ascertained, though too late to profit by the information, that two of the largest and finest mosses that are known, the *Splachnum rubrum* and *S. luteum*, may be found in the

same vicinity. The *Cetraria nivalis* and *C. cucullata* abound in the pine woods, and here I first observed the *Pinus taxifolia.* That curious moss, the *Gymnostomum pulvinatum* is met with on the rocks, and also *Neckera Menziesii, nov. sp.*; the latter but rarely. At the head of Jasper's Lake, our tract led us over a rather lofty rock, where, besides the beautiful *Eriogonum* and *Dryas tenella,* I found a plant much resembling a *Saxifraga,* with roundish leaves and pale red flowers, and also several of the alpine species of *Potentilla.* From this rock I obtained the first good view of the surrounding mountains, which gratified me extremely. The rocks are mountain limestone, and destitute of vegetation for about one-third of their height, but whether this is owing to their great elevation, or to a want of soil, I am unable to determine. The Red-Deer River at this place takes a bend to the south, which it continues for upwards of 70 miles, forming a narrow valley of about a mile in breadth, with a fine range of mountains on each side, or they may rather be called groupes of mountains, as they are frequently intersected with deep narrow valleys, running in almost every direction. Their general height, skirting the river, may be computed at from 3 to 7,000 feet above it; there is generally a secondary kind of range at their bases, probably formed by the gradual crumbling down of the more elevated parts; and almost always clothed with vegetation to the very top, while two-thirds or more of the highest range consists of nothing but bare rock, destitute of even a Lichen; a circumstance which I attribute more to the nature of the soil than to the altitude of the mountains. The rocks frequently rise perpendicularly to a considerable height, but their summits are so sloping as to render them mostly accessible. On the whole, I thought their vegetation less interesting than what I had remarked on the rocks about the head of Clova and Lochna-gar in Scotland. The dry arid sides of the low hills are thickly covered with *Arbutus uva-ursi,* mixed sometimes with *Juniperus prostratus,* a plant which is also frequent on the steep and dry banks of the Saskatchawan. About half-way between Jasper's House and the commencement of the

Portage, we crossed the Assinaboyne River, which is a large branch of the Red-Deer River, and running at almost right angles with it, to the westward. I had afterwards an opportunity of following the course of this stream for 100 miles, but yet did not reach its source.

I here first met with a species of *Viscum* (?) on the *Pinus Banksiana*, and giving the branches of that tree a most curious appearance; also with *Splachnum mnioides* and *S. angustatum*; and on the rocks grows *Gymnostomum pulvinatum*, which for some time I mistook for a variety of *Grimmia apocarpa*, to which it bears a considerable resemblance; *Hypnum obtusifolium*, *Didymodon rigidulum*, and *D. fragile*, also occur here.

On reaching the Portage, we halted for a day or two, to arrange the luggage, preparatory to crossing the Rocky Mountains. The very great difficulty with which this process was attended, compelled me to give up the resolution I had formed of going for the winter to the Columbia River, and decided me upon remaining among the Rocky Mountains, the gentleman who was in charge of the brigade having kindly promised to engage a hunter to remain with me during that time. He also provided me with horses to convey my luggage, but as I had left my tent and other necessaries at Edmonton House, I found myself but indifferently equipped for an American winter. My plan was to reach the Smoking River, where the Hudson's Bay Company has an establishment: but unforseen circumstances prevented my accomplishing this design. The brigade left the Upper House on the 18th of October, and, for the first time in my life, I found myself alone with Indians; but every thing was so new to me, and I had such agreeable anticipations as to the result of my next summer's occupations, that I scarcely felt the solitariness of my situation. The snow again disappeared partially from some of the low grounds, and I was busily engaged in investigating, as far as possible, the promise of the ensuing spring. *Didymodon latifolium*, *Gymnostomum ovatum*, and a very handsome yellow *Lichen*, were growing upon the trees, likewise the curious parasitical plant,

which I mentioned before, as being probably a species of *Viscum*, was seen on the *Pinus Banksiana*. At the junction of the Assinaboyne with the Red-Deer River, I was first gratified with a sight of the Rocky Mountain sheep. At this season their flesh is excellent, superior, in my opinion, to the best English mutton. After they have been once disturbed, they become so shy and vigilant, that it is difficult to approach them, taking refuge in the inaccessible precipices, but coming down to the grassy hills to feed, where the hunters frequently surprise them.

Our route now lay along the Assinaboyne River, and we proceeded slowly, encamping at every 15 or 20 miles, and often remaining two or three days in the same spot, for the sake of hunting. The following is the circumstance which hindered our reaching the Smoking River. The hunter whom I had engaged was accompanied by his brother-in-law, an Iroquois Indian, whose wife was taken in labour. According to the custom of these tribes, the woman quitted the tent in which she had lodged, until she should be delivered, and owing to the extreme severity of the weather, the ground being covered with snow, and the mercury indicating 38 degrees below zero, both the mother and her infant perished. The despondency which this event excited in the minds of the survivors, was so deep, that ten or fifteen days elapsed before they could be induced to quit the spot. The snow, during this interval, was gradually increasing, so that the only places which I could investigate were the perpendicular sides of banks and rocks; for the trees, being chiefly of the fir tribe, produce but very few lichens. Here I observed *Dufourea arctica, Tortula brevifolia*, and *Dicranum latifolium*. It was the beginning of December before the hunter could be prevailed on to overcome his grief so far as to resume his occupation. We had ascended the Assinaboyne River upwards of 100 miles, when it here takes a south-westerly course, intersecting the chain of the Rocky Mountains almost exactly across. The snow had become so deep, that the horses could proceed no farther in that direction, and we were, in consequence, compelled to

abandon altogether our hope of reaching the establishment on the Smoking River for this season. We therefore altered our route, keeping outside the mountains, and reached Baptiste River, so named after my hunter, who was in the habit of wintering there occasionally. This river falls into Red-Deer River, but it was the 1st of January, 1826, before we reached the station where we proposed to pass the winter. On the sandstone rocks of Baptiste River, I met with *Gymnostomum pusillum* and *Weissia Seligeri.* The spot which the hunter had selected was an extensive plain, abounding in *dwarf Willows* and *Betula glandulosa ;* and the burnt woods which covered the country around afforded good grass for the horses, of which we had a large band, and sheltered also the *American Elk* or *Moose Deer*, and the *Wood Buffalo*, which choose those burnt woods as their favourite resort. These animals, if frequently disturbed, will quit the place, and we now found this to be the case; for our hunter, though considered one of the most expert shots in the country, found it difficult to procure enough for our supply, and was often obliged to travel for eight or ten days without seeing one of these creatures. As we were now likely to remain stationary for a short time, I set about building myself a brushwood hut, formed of the boughs of the *White Spruce*, and soon completed it. I had calculated upon being able to procure a good many specimens of birds during the winter, but here too I was disappointed, for most of them quit this country during the hard weather, and a very few kinds only remain, chiefly belonging to the genera *Tetrao, Picus, Stryx, Corvus*, &c. Among them I remarked two species of *Parus*, and the *Lesser Redpoll.* It is difficult to understand how these little creatures can resist the severity of cold in these high latitudes. A slight shower of rain fell about the 10th of January, which is a very rare phenomenon at this time of year; and it caused us great inconvenience, by moistening the surface of the snow for a few inches, when the succeeding night's frost formed it into a hard crust, by which travelling was rendered very laborious and difficult, and it became almost impossible to get near any animal, owing to the noise

made in walking, by the breaking of the crust. At this time, January 10th, the snow was about two feet deep, and it gradually increased till the 27th of March, its greatest average depth being from five to six feet. Our horses began to suffer considerably from the unusual severity of the winter: the hunters lost the whole of the young ones of the preceding year, and one which I had received from the Company died also. The animals of all kinds were becoming more and more scarce, so that my hunter resolved upon leaving this spot, and accordingly removed 80 or 100 miles farther down the river, but I preferred remaining where I was, though my situation became very lonely, being deprived of books or any source of amusement. When the weather permitted, I generally took a walk, to habituate myself to the use of snow shoes, but I added very little to my collections. The hunter returned about the beginning of March, bringing with him some venison, which proved a very acceptable supply, as the *Partridges*, *Tetrao canadensis*, and *T. rupestris*, the only game to be met with in my short rambles, were becoming difficult to be obtained. Nothing particular occurred until the 1st of April, when I determined upon going back to the Portage, in hopes of receiving letters from Captain Franklin or from home, as well as for the purpose of procuring specimens of the waterfowl which might then be expected to return to the many lakes in the vicinity. I left Baptiste River, accordingly, accompanied by the Indian who took charge of my horses, and carrying with me the few specimens of plants and birds that I had been able to obtain. In six days we reached Jasper's House, the distance in a direct line being from 150 to 200 miles, which was the greatest journey I had ever yet performed in snow shoes.

On the 9th I had the pleasure of meeting Mr. M'Millan, who brought me, from Edmonton House, my tent, another supply of paper, and a little tea and sugar, by which my situation was rendered comparatively comfortable. The winter, he assured me, had been remarkably severe, and vegetation was a full month later than usual. The ducks and geese now began to return, so that my time was fully

occupied till the 6th of May, when the brigade arrived, having crossed the Rocky Mountains from the Columbia River. They found me encamped near a small lake, about half-way between Jasper's House and the commencement of the Portage, living upon *White Fish*, which, though small, are of an excellent quality, and which I did not observe in any other lake among the Rocky Mountains. I agreed to accompany the brigade as far as Jasper's House, and accordingly set out with them on horseback. Having crossed the Assinaboyne River, the party halted to breakfast, and I went on before them for a few miles, to procure specimens of a *Jungermannia*, which I had previously observed in a small rivulet on our track. On this occasion I had a narrow escape from the jaws of a grisly bear; for, while passing through a small open glade, intent upon discovering the moss of which I was in search, I was surprised by hearing a sudden rush and then a harsh growl, just behind me; and on looking round, I beheld a large bear approaching towards me, and two young ones making off in a contrary direction as fast as possible. My astonishment was great, for I had not calculated upon seeing these animals so early in the season, and this was the first I had met with. She halted within two or three yards of me, growling and rearing herself on her hind feet, then suddenly wheeled about, and went off in the direction the young ones had taken, probably to ascertain whether they were safe. During this momentary absence, I drew from my gun the small shot with which I had been firing at ducks during the morning, and which, I was well aware, would avail me nothing against so large and powerful a creature, and replaced it with ball. The bear, meanwhile, had advanced and retreated two or three times, apparently more furious than ever; halting at each interval within a shorter and shorter distance of me, always raising herself on her hind legs, and growling a horrible defiance, and at length approaching to within the length of my gun from me. Now was my time to fire: but judge of my alarm and mortification, when I found that my gun would not go off! The morning had been wet, and the damp had

communicated to the powder. My only resource was to plant myself firm and stationary, in the hope of disabling the bear by a blow on her head with the butt end of my gun, when she should throw herself on me to seize me. She had gone and returned ten or a dozen times, her rage apparently increasing with her additional confidence, and I momentarily expected to find myself in her gripe, when the dogs belonging to the brigade made their appearance, but on beholding the bear they fled with all possible speed. The horsemen were just behind, but such was the surprise and alarm of the whole party, that though there were several hunters and at least half-a-dozen guns among them, the bear made her escape unhurt, passing one of the horsemen, (whose gun, like mine, missed fire,) and apparently intimidated by the number of the party. For the future, I took care to keep my gun in better order, but I found, by future experience, that the best mode of getting rid of the bears when attacked by them, was to rattle my vasculum, or specimen box, when they immediately decamp. This is the animal described by Lewis and Clark in their Travels on the Missouri, and so much dreaded by the Indians. My adventure with the bear did not, however, prevent my accomplishing the collecting of the *Jungermannia.* It is No. 17 of the "American Mosses."

On the 7th of May, I found the first plant in flower, namely, the *Anemone Nuttalliana;* the *A. borealis* and *Saxifraga oppositifolia* soon followed, with *Alyssum arenosum* and *A. arcticum*, some species of *Draba* and *Carex*, &c.

Among the mosses, I must not omit *Neckera Menziesii, Didymodon latifolium, D. oblongifolium,* and *Weissia macrocarpa,* (the two latter growing on slate,) *Funaria Muhlenbergii, Hypnum Halleri,* and, though very sparingly, *Splachnum rubrum,* and *S. luteum.*

Immediately upon arriving at Jasper's House, I had despatched the Indian who took charge of my horses back to Baptiste River, there to take care of them until the season was sufficiently advanced to allow of their travelling. He arrived on the 17th, bringing the animals and the paper, &c. which I had left there, and charged also with the

unwelcome intelligence, that the hunter with whom I had spent the winter, and whom I had engaged to accompany me to the Rocky Mountains in the summer, had, with that fickleness which is characteristic of most Indians, changed his mind, and refused to go to the mountains this season. This circumstance caused me much uneasiness, and I had no other remedy but to remain with the old Canadian who had charge of the Company's horses for the Portage; and as he had only stated places where his animals could find pasturage, I was much more confined in my range than I should otherwise have been. Although I might possibly have killed as much game as was necessary for my own use and that of the person who kept the horses, yet the time which this would have occupied would have left me but little leisure for any other employment.

We remained in the vicinity of Jasper's House, until the 15th of June, making collections of all that the country afforded. The species of *Potentilla* and *Ranunculus*, which are numerous among the Rocky Mountains, were now coming into flower. *Arbutus alpina, Dryas tenella*, &c. were also in bloom, and the beautiful *Calypso borealis* ornamented the pine woods. On leaving Jasper's House, we skirted along the mountains to the north, halting occasionally for a day or two, until we reached the Lac-la-Pierre, a distance of perhaps 60 miles in a straight line. This lake is surrounded by what I have called secondary rocks, covered with vegetation, which was advancing rapidly, so that I had my hands completely full of employment, but I had now to encounter a formidable obstacle, and one of which I had formed very inadequate ideas, in the rise of the waters, caused by the melting of the snows. The smallest ravine, that had been dry for nine months of the year, becomes, under these circumstances, an impassable torrent. The larger rivers are flooded in proportion. A fall of the temperature certainly occasions a corresponding diminution of the waters, but these transitions are so sudden, that it is dangerous to trust to them, as I experienced more than once, when having succeeded in crossing a stream in the morning, I found it so

swollen on my return, that I was compelled to remain for days a prisoner on the other side, to the great hindrance of my plans, and injury of the plants collected. This difficulty could not be avoided but by having two or three men and a *skin canoe.* Many of the plants that grow here are very local, apparently often confined to one particular mountain or valley, and I am quite confident that if any one could penetrate farther into the interior than it was in my power to do, they would be amply repaid for the fatigue thereby incurred. It might be easily managed by carrying a sufficient quantity of *Pemmican*, made previously, or obtained from the flesh of the animals that occur here, and thus reaching the Height of Land before the melting of the snow. As an instance of the exclusive locality of some plants, I may mention what I observed in a small plain, surrounded by mountains, and situated about 30 miles west from Lac-la-Pierre, and called by the hunters the Wolf Plain. Here I gathered *Claytonia lanceolata*, *Anemone patens*, a large species of *Valeriana*, *Spergula saginoides*, *Veronica officinalis*, *Cineraria?* *Tussilago frigida*, *Lupinus perennis*, and new species of the genera *Ranunculus*, *Caltha*, *Trollius*, *Potentilla*, &c. &c.; most of these were in the greatest abundance, and scarcely observed anywhere else during my route. *Splachnum urceolatum* and *sphæricum* also grew there, and *Nephroma polaris*. Among the mosses which I saw in the vicinity of Jasper's House, were *Phascum cuspidatum*, *Gymnostomum Heimii*, *Weissia latifolia*, *Systylium splachnoides*, *Tayloria splachnoides*, &c.

The effects of the unusually cold winter were now observable in the excessive emaciation of the animals, which were reduced to skin and bone. All vegetation was extremely backward, and according to the assertion of the old Canadian, who had been resident for many years among the Rocky Mountains, the waters were higher than they had been for twenty years. To conclude, the mosquitoes were also dreadfully numerous, owing to the almost continual rain; for in dry weather, when the atmosphere is clear and frosty at night, these insects are much diminished in quantity. We

remained in the vicinity of Lac-la-Pierre, making excursions for 15 or 20 miles around, and then left the camp, and pitched our tent at *Grande Saline*, about 20 miles south-west of our last station. Here are a great number of salt springs; but I observed little that was peculiar in the vegetation. At this spot only I found *Splachnum heterophyllum*, and at about a day's ride, 60 miles west of this place, I first met with *Veratrum viride*, and several species of *Potentilla* and *Ranunculus* that I had not previously seen. About the 20th of July, we began to retrace our journey, as the Canadian had received orders to have his horses in readiness at Jasper's House by the 24th, as the Governor of the Hudson's Bay Company was expected to cross to the Columbia at this time. I therefore determined to return at the same period, hoping to be able to cross by the assistance of the Governor; but other arrangements having been effected, he did not arrive. After waiting for ten or twelve days in fruitless expectation, I was compelled to give up the scheme, as the waters were too high to be passed without the assistance of canoes, &c. Having here fallen in with several Indians, who had assembled to receive ammunition, &c. from the Governor, I engaged one of them to accompany me in a tour through the Rocky Mountains to the north, as far as the sources of Peau River. After depositing the specimens I had collected at Jasper's House, we again set off, taking Lac-la-Pierre in our route, for the purpose of obtaining the seeds of those plants which I had already observed there. Here we staid for a few days, in order to lay in provisions for our journey, but were very unsuccessful, only killing a single Rocky Mountain sheep, which was quickly devoured, as my hunter's family consisted of his wife, five children, and himself, besides me, and the person that took charge of my horses. We therefore determined upon proceeding, and of depending upon what we should meet with on the route, which proved very inadequate to our demands; however, we contrived to make shift, until we reached the Smoking River, one of the branches of Peau River, where we again met with some of the mountain sheep, and succeeded in killing a few, which

put a close to our state of comparative starvation. The Smoking River is about 200 miles, in a direct line, from Jasper's House. Here I first found *Rhododendron lapponicum*, *Mitella cordifolia*, and a new species? *Woodsia hyperborea*, a new *Caltha*, a species of *Trollius*, &c., *Conostomum boreale*, *Hypnum confervoideum*, *Eriophorum capitatum*, and several other rare species. Between Providence and Smoking River, we passed a chain of beautiful green grassy hills, much frequented by the buffaloes. This journey was not, on the whole, very productive. I found *Menziesia empetrifolia* and *M. globularis*, both in great abundance, also a new species of *Menziesia* with white flowers, two species of *Befaria*, *Rubus stellatus*, a *Mimuclus* like *Lewisii*, *Veratrum viride*, a small shrub with fine flavoured fruit, which also grew on the Height of Land, *Juncus biglumis* and *arcuatus*, and a new species, and *Tiarella cordifolia*. All the hills in this neighbourhood are covered with *Andromeda tetragona*. We had a considerable fall of snow on the 24th of August, which only partially left the ground afterwards, continuing to linger on the high spots, and it much impeded my operations. I remained here until the latter part of September, causing pemmican to be made of the buffaloes' flesh, which my hunter killed, with the intention of carrying it to the Columbia, where I hoped to spend the winter among the mountains; but letters that I received from Captain Franklin obliged me to alter my plans, and the frequency of snow showers compelled me to return to the Portage by a different route from that which I had pursued in going. One of my principal objects in visiting Providence had been to obtain specimens of the *Mouton blanc*, a kind of goat, but though I devoted several days exclusively to that pursuit, I had not the satisfaction of seeing one; although in some seasons of the year they are said to be plentiful. Little occurred worthy of remark on my return to Edmonton House, where I busied myself in gathering seeds of the plants I had formerly collected.

Now, however, I determined upon crossing the Portage, with the Columbia brigade, as I had formed a strong idea

that the vegetation would change considerably in its character, after passing the Height of Land. This surmise I found to be correct, as may be seen from the habitats affixed to the specimens from the Rocky Mountains. About 15 or 20 miles above the commencement of the Portage, we left the main branch of Red-Deer River, and followed a lesser stream that here joins it, winding along its banks, and not unfrequently scrambling in the bed of it, until we reached a small lake where it takes its source, and the Height of Land. The lake is not more than 200 yards in length, and is called the *Committee's Punch Bowl.* Out of its other extremity flows one of the tributary streams of the Columbia. On reaching the middle, I took a hearty draught, pleasing myself with the thought that some of the water I had tasted might have flowed either to the Frozen or Pacific Oceans.

I observed little change in the vegetation until within ten or a dozen miles of this lake: the trees were gradually diminishing in size, and, on the sides of the high ground, reduced to mere bushes, principally *White Spruce* and *Balsam Poplar.* I may enumerate a few of the plants, as far as I am able to do so from recollection. A *Saxifraga* like *S. trifida*, but with the foliage simple; another resembling *multifida*, the leaves much divided, with creeping shoots. *S. leucanthemifolia?* entirely viviparous; another species with nearly round foliage, and also viviparous; another plant belonging to this order, with oblongo-ovate leaves, approaching in habit *S. umbrosa*, but having the leaves distichous, and white underneath; a small plant, growing in spongy places, like an *Hippuris*, about two inches high; a diminutive creeping plant, exactly similar to *Anagallis tenella*, of which I preserved no specimens; a low procumbent shrub, with cordate foliage, and bearing very fine flavoured red berries; a hexandrous plant, probably a *Fritillaria*, only the stem and seed-vessels remaining, of which seeds were brought home, but I am ignorant whether they have vegetated, &c. The following mosses also occurred: *Dicranum Starkii, Trichostomum patens, T. sudeticum, T. aciculare*, and *T. lanuginosum; Hypnum molle, H. stramineum, Bryum Zierii*, and a species

named by Dr. Hooker *B. Schleicheri*, which grows in the stream that falls into the Columbia, at its very eflux from the lake. When it is considered that we visited this place in the middle of October, and during a violent snow storm, which had already covered the ground to a depth of several inches, we may form some idea of what might be expected to be the productions of this country, lying at the very foot of the Rocky Mountains, during fine weather, and at an earlier season of the year, when so many peculiar plants were still observable, although I was obliged to keep up with the brigade, and we proceeded as quickly as possible. At the time of my return, the snow was so deep as to preclude the possibility of finding any thing. The first glacier I saw, was about twenty miles before reaching the lake; but I visited a very large one at ten miles nearer to the lake. I found the trees, or rather bushes, of *White Spruce* and *Balsam Poplar*, growing almost close to the ice. The only thing that repaid me for the trouble was a patch of *Trichostomum lanuginosum*, the only one I met with during the journey. To the plants I have already named, may be added *Tiarella trifoliata*, *T. cordifolia*, and *T. Menziesii*, a species of *Spiræa*, *Vaccinium hispidulum*, *Gaultheria serpyllifolia*, and another *Vaccinium* allied to *V. Myrtillus;* none of these, however, were in flower. Amongst the *Cryptogamiæ*, I also found here *Adiantum pedatum*, and *Aspidium Lonchitis; Polytrichum pallidisetum*, var., *Grimmia torquata*, a nondescript *Didymodon*, and doubtless many more which have escaped my memory, and which, with those enumerated, were scarcely seen any where else. When the lake is passed, you descend rather gently for about eight or ten miles, with a similar vegetation to that of the eastern side; but when the summit of the Great Hill, or Grand Côte, a few miles beyond the Height of Land, is attained, the change becomes most striking. Instead of the stunted miserable looking *Balsam* and *White Spruce* which grow on the eastern side, the *Pinus Strobus* and *P. canadensis*, with *Thuja occidentalis*, and several other trees, increasing in variety as you descend, and often attaining an enormous size, present themselves to view, their branches also covered

with *Sticta pulmonacea*, and *Cetraria glauca*, enhancing materially the novelty of their appearance. Here also I found a most troublesome kind of *Aralia*, the *A. erinacea*, *Hook.* in great abundance; also *Menziesia ferruginea*, and a large species of *Spiræa*, allied to *S. Aruncus*; two or three different *Uvulariæ*; a species of *Dracæna*, bearing only one berry of a blue colour; *Pyrola umbellata*, a very singular and new kind of umbelliferous plant; *Lycopodium Selago*, var., *Hypnum robustum*, (Hooker;) *H. vagans*, *tenax*, and *loreum*; *Dicranum heteromallum*, and *D. crispum*; *Polytrichum alpinum*, *urnigerum*, and *undulatum*, &c. The "Grande Côte" is of very steep and difficult descent for two or three miles. Upon reaching the base, we came upon Portage River, which has its rise in the lake called the Committee's Punch Bowl, and which, running through a small and narrow valley, perhaps 20 miles long, finally falls into the Columbia River. The stream is very winding, and it is necessary to cross it in many places, which, at this season of the year, was a very unpleasant operation, the water being often as high as a man's middle. The track leaves the river in two places, where the valley is quite filled with the current, or intercepted with rocks, and traverses the points of two woods, in which I observed *Pothos fœtida*, which had not occurred since leaving New York, and, for the first time, *Mahonia pinnata*, and a shrub resembling *Box-wood*; two or three species of *Vaccinium* unknown to me, and growing two or three feet high, with large but not very well flavoured fruit; a species of *Noli-me-tangere*; *Circæa alpina*; *Lycopodium Selago*; *Aspidium Lonchitis*, *aculeatum*, and *Phægopteris*; on rocks opposite the first wooded point, were *Hypnum neckeroides*, *Bryum hornum*, *Weissia acuta*, (likewise found on the Height of Land,) *Bartramia Halleriana*, *Dicranum pellucidum*; and on stones in the river, that most curious moss, *Scouleria aquatica* (of Hooker, in No. I. of the present work, t. 19,) while the "battures," or gravelly banks, left bare by the receding of the streams, were covered with *Dicranum julaceum*, *D. pellucidum*, &c. We reached the Boat Encampment on the Columbia, the 17th of October. On the following day, the brigade pursued their voyage, and

I began to prepare for re-crossing the Rocky Mountains. I observed little that was interesting or peculiar in the vegetation about the Columbia. All the plants were out of flower, and most of them, indeed, in a state of decay. It was with much regret that I began to retrace my steps back to Jasper's House, with the person in charge of the horses; and till our arrival at the commencement of the Portage, the weather continued wet and stormy, the Height of Land being deeply covered with snow, so that my collections received no additions. On my journey, I met with Mr. Finnan M'Donald, a gentleman who had been for upwards of twenty years in the Company's service, to the west of the mountains. From him I received much information relative to the districts south of the Columbia, which had been explored by himself only, and also an account of the enormous pine tree found in the Umpquha country, and of a tree smelling like *Laurus Camphora*, both, I understand, since introduced into Britain by Mr. D. Douglas. We arrived at Jasper's House on the 30th of October, and spent ten or fifteen days there in making arrangements for descending the river from Fort Assinaboyne, and in exploring the adjacent country. The most interesting object that I saw, was a species of *Pinus*, whose general habit bore a considerable resemblance to *Pinus Strobus*: the cones are about double the size of those of *P. sylvestris*, but blunter at the apex, and with seeds very large in proportion to the cone. The squirrels, or some bird, had devoured the greater part of them, and mutilated the remainder. Of this tree, I observed but very few individuals, and these were confined to the very highest parts of the secondary mountains, such as near the glacier which I visited at the Height of Land. *Pinus taxifolia* is common here, and attains a larger circumference at the base than any other species which occurs on the eastern side of the Rocky Mountains. Its shape resembles a sugar loaf, tapering very quickly to the top. The bark is remarkably thick and rough near the root, and is frequently covered with *Orthotricum obtusifolium*, and with a fine yellow *Lichen*, with brownish black shields, which the natives of this country use for dyeing. Its

cones resemble those of the *Spruce Fir*, but are rather smaller. The seeds are furnished with remarkably long wings, which protrude half-an-inch beyond every scale, giving the cones a very singular appearance. There is also in this vicinity a species of *Rubus*, resembling *R. odoratus*, but having white flowers, and a large and very insipid fruit; and the *Aster exscapus*, so called by Dr. Richardson, abounds here. It has a very singular habit, little like that of the genus *Aster;* the flower buds are formed in Autumn, and bear an exact similarity to those of *Globularia vulgaris*. I watched it long, with great interest, expecting it to produce something very handsome, but found the blossoms remarkably insignificant, the rays being small and nearly white. *Erigeron compositum* is plentiful, and a very pretty little *Astragalus*, which I saw no where else: also *Cryptogramma acrostichoides*, *Pteris gracilis*, and a species (?) of *Nephrodium*, with the fronds whitish beneath.

Having accomplished our preparations, I embarked my stock of specimens, and, with Mr. M'Donald and his family, began to descend the river. The winter had set in with all its rigour; the cold became severe, the river had subsided greatly, and being choked with snow, and full of rapids and shallows, we found great difficulty in proceeding, being often obliged to quit the boat and lift her over the stones. We, however, continued to drift along with the stream for a few days; but our boat was so large and heavy that she frequently struck against the shallows, and we were almost worn out with fatigue, with our being continually obliged to jump into the half frozen water to endeavour to force her along. Mr. M'Donald's legs were much cut and bruised with the floating ice, and I, who kept on my stockings to avoid this misfortune, suffered on the other hand with frost, which rendered my wet clothes a most painful encumbrance. The ice and snow now became so intense and heavy, that though we had calculated on reaching Fort Assinaboyne before the river became wholly impassable, we found ourselves unable to proceed, and stuck fast on the seventh day, when not more than half-way on our voyage. As Mr.

M'Donald's family were incapable of travelling, he agreed to encamp and remain with the luggage, while a clerk belonging to the Company and myself prosecuted our journey on foot to Fort Assinaboyne, whence we were to send horses to his assistance. We had calculated on reaching this place in three days, but it was the fifth evening before we arrived, having, however, met with no other hindrance than the unavoidable hardships of such a journey. On the way I remarked the *Scheuchzeria palustris* growing in a small lake, its seed-vessels only appearing above the ice. I met with this plant in no other situation. We received much kindness, on our arrival, from Mr. Harriot, the gentleman who has the charge of the Fort, who also sent horses, as soon as they could be procured, to the relief of Mr. M'Donald, who had suffered great anxiety from the delay occasioned by our long journey, and whose provisions were nearly exhausted. He reached us, happily, about the 1st of December, bringing with him the whole of the luggage in good order. After resting here for a few days, we prosecuted our journey to Edmonton House, where we intended to winter, and got there about the middle of December, being most kindly welcomed by J. Rowand, Esq. Superintendant of the Fort. I immediately applied myself to the examination and arrangement of my specimens, which, it gave me much pleasure to find, were in excellent preservation, and as I now considered the most hazardous part of the expedition to be over, I spent the three succeeding months in comparative ease and comfort. In the beginning of February, I received the agreeable intelligence from Dr. Richardson of the complete success of his undertaking, and that he expected to be at Carlton House in February, where he desired me to join him as soon as convenient. Accordingly, I quitted Edmonton House in the middle of March, taking with me a single specimen of every plant gathered among the Rocky Mountains; also a train of dogs, and a half-bred and Indian guide. Owing to some misunderstanding between the Hudson's Bay Company and the Indians of the plains, it was considered unsafe to pursue the usual track between the Posts, which very much

lengthened our route and caused us considerable inconvenience. We proceeded for a few days along the river, and then struck into the wooded country north of the Saskatchawan, to avoid encountering the hostile tribes. We shortly began to feel symptoms of snow blindness, which considerably retarded our progress, and although we had a sufficient supply of provisions for this journey in usual cases, we still found our stores considerably diminishing. The blindness became worse, and although we fired at several animals, we did not succeed in killing any. To add to our distresses, we now discovered that we had gone too far into the woods, by which the distance that we had to traverse was much increased. Our dogs became excessively fatigued, so that we were under the necessity of cutting up our sledge and carrying the luggage ourselves. The provisions were wholly spent, and I was compelled to destroy a fine specimen of the *Jumping Deer*, as I have before mentioned, although it was the only one we had been able to procure, and I had carried it all the way from the Columbia River, where I had killed it. As I had not been very particular in divesting this skin of the flesh, it proved the more valuable on that account. Our ignorance of the actual distance which lay between us and the Fort, prevented the Indians from desponding, for we expected to reach it every succeeding night; but we grew weak with exhaustion, and proceeded, therefore, but the more and more slowly. Within about a day's journey of the Fort, the half-bred Indian recognised the spot where we were, and we had the good fortune to kill a *Skunk*, an animal which I have omitted to mention in my former list, and which afforded us a comfortable meal. This creature, when hunted, discharges an intolerably fetid liquor upon its pursuers, and few dogs will afterwards attempt to destroy it. The one which we killed on the evening before we reached the Fort, proved tolerable eating, though it had a strong flavour of this obnoxious liquid. The distance being now so inconsiderable, I laid down my luggage, and we made our way to the Fort as quickly as possible. You may judge of my happiness at being first met on my approach by Dr.

Richardson, who had been looking for us some time, and had become very uneasy at our delay. I immediately experienced the hospitality of P. Prudens, Esq. Superintendant of the Fort, and I may safely say that I did justice to it; for after having more than once despatched all the victuals set before me, my voracity induced Dr. Richardson to inquire how long I had fasted, a question which I evaded for some time, under apprehension that he would use his authority to prevent the bad consequences which sometimes result from repletion after a long fast; however, I am happy to say that no uncomfortable effects ensued, and after a night's rest, I was almost fit for another journey. It was on the 5th of April that I arrived, and immediately set about gathering specimens of the different birds and animals found in the neighbourhood of Carlton House.

Having previously enumerated, so far as I could, the most remarkable plants, I shall now mention a few of the animals and birds that came under my observation. The one that claims the first attention is the *Rocky Mountain Sheep*, the animal called "*Big Horn*," by Lewis and Clark. In size it rather exceeds the largest English varieties of the common sheep. The rams are very remarkable for their immense and heavy horns, which turn round so as to form a volution and a half; and when this is the case, I have been assured that they often prove fatal to the animal, their points coming in contact with the ground, and preventing them from browsing. The female has small curved horns, like the common goat. Instead of wool, these sheep have hair like the moose deer. They are a timid inoffensive animal, herding in small flocks, and, on the approach of a dog, betaking themselves to some rocky precipice, whither the enemy cannot follow them; they then become an easy prey to the hunter, who may shoot them at his leisure. The female brings forth one and sometimes two young at a time, and hides them in some inaccessible place, where she visits them once or twice a-day, to give them suck, till they are strong enough to shift for themselves. They prefer the bare grassy mountains where there are steep rocks, to which they

may retreat in case of alarm, in winter descending lower, but never quitting the mountains. There is a kind of earth met with among slate-rocks, of which these sheep are remarkably fond; it is probably impregnated with salt, and by digging it out, they form caves of a considerable size. I have been repeatedly startled, when creeping along a narrow ledge of rock, to find a whole flock of them thus engaged; and as it sometimes happens that such spots are accessible only by one path, it is necessary to retreat as quickly as possible, or run the risk of being thrown down by them and dashed over the precipice. They appear to be tenacious of life, as they frequently make good their escape after being severely wounded. Their flesh is excellent, exactly resembling, both in appearance and flavour, the best English mutton. The *White Sheep*, which I mentioned before as having fruitlessly endeavoured to obtain, is another very interesting creature, and peculiar to the Rocky Mountains. It is said to resemble the common goat in every respect, except having a fine and beautiful wool intermixed among the hair, particularly along the back and buttocks. I have seen the skins of this animal, but was not so fortunate as to procure a good specimen. Although one of my main objects in going to the mountains north of the Smoking River, was to obtain the *White Sheep*, none were to be found, though at times they frequent that neighbourhood in considerable numbers.

The bears next claim our notice: and first, the *Grisly Bear*. As I have already mentioned the only instance of my being attacked by them, I have only to add that they are a very formidable creature, from their great size and strength, being said to prove an overmatch for every other animal inhabiting these regions, not excepting the Buffaloe. They are abundant about the Rocky Mountains, differing much in colour, varying from a light grey to a dark chocolate hue; the last kind being said to be more ferocious than the others. They abound among the mountains north of the Smoking River. Except in the first instance, I always found the bears disposed to retreat as fast as possible, without offering the least affront; and as I was but indifferently armed,

carrying only a single-barrelled gun, I considered it the safest plan to follow their example; particularly as there are generally two or more of these creatures in company. I therefore contented myself with procuring two fine specimens of their heads, my means of conveyance being altogether inadequate to the carrying a whole skin; but I was so unlucky as to lose one of these heads, which a Wolverine carried away while it was drying. The flesh is very bad eating, the very dogs refusing to touch it. Their food consists of flesh, berries, and roots: the berries of the *Hippophae canadensis* have a very obvious effect upon them, acting as a strong cathartic. They lie dormant for a few months in the depth of winter, and when they retire to their hiding-places, generally under a fallen tree, or some similar situation, they are extremely fat, and even when they first sally out, are in good condition, which, however, they soon lose. I saw several miserable objects, (proofs of their prowess,) at the various establishments of the Company, but as I have already detailed the particulars to Dr. Richardson, it will be unnecessary here to repeat them. The *Black Bear* is also an inhabitant of these mountains, but it is a much less formidable animal than the grisly bear. These are likewise subject to great variety of colour, and I have seen the skin of one nearly white, at least cream coloured; there is also a kind with a reddish snout, which the hunters consider the most ferocious, but they seldom or ever attack man, unless wounded, or when defending their young. Their food appears to consist principally of roots, and their flesh is tolerably good food, as I often had occasion to experience, the paws being considered a great delicacy by the Indians, who hunt them with avidity, while they are in great fear of the grisly bear. The description of them in Lewis and Clark's Travels, appears rather overcharged; but perhaps they are more ferocious on the Missouri than they are in more northern latitudes. A species of *Marmot* inhabits the Rocky Mountains, of which I am sorry to say that no specimen was obtained. It is called by the Canadians *Le Siffleur*, being remarkable for its whistling. I saw it occasionally,

but never got near enough to shoot it; it appears to be about the size of a common cat, and resembles a badger in colour. These marmots are extremely vigilant, always placing a sentinel, who watches while the rest are feeding or cutting provisions for the winter; on being disturbed, he gives a shrill whistle, which is repeated from one to another along the whole side of the mountain which they inhabit. Their flesh is much esteemed by the natives, who take them in traps, and they are much more frequent on the western than the eastern side of the mountains. I observed them on the mountains near the Wolf's Plain, and also saw there the following little animal, *Arctomys Parryi*, which is abundant there, and in its manners appearing exactly to resemble those species which inhabit the plains about Carlton. Specimens of it were brought home. There is also another diminutive animal found among the Rocky Mountains, whose general form and appearance exactly resembles a young rabbit of five or six weeks old, having small round ears. It is probably another kind of marmot, and lives in rough stony places near the summits of the mountains. It has a weak cry, resembling that of a rabbit when hurt. Upon the approach of any one, it gives the alarm, disappearing among the stones, and soon showing itself again at a distance of fifteen or twenty yards from its first station. They appear to make no burrows of their own, but make their way among the interstices of the stones with great celerity. They live on grass, and probably sleep during the winter.

Among the birds of these regions, the *Calumet Eagle* is one of the scarcest. It is about the size of the common grey eagle of our mountains, and nearly of the same colour, the tail excepted, which is very beautiful,—black at both extremities, and white in the middle. They are highly prized by the natives, who decorate their war bonnets and the stems of their calumets with their feathers, whence I have adopted the name. It would appear that they are very rare, as I never saw any but the one I killed. It was a very old bird, and the plumage in bad order, having been shot in the summer-time, upon the summit of one of the mountains near

Lac-la-Pierre. Had I but the pen of M. Andubon, I could give as striking a description of it as he gives of the "Bird of Washington." Of the genus *Tetrao* I remarked the following species: *Tetrao Phasianellus,* the one which I have already described as inhabiting the plains; *T. canadensis,* which frequents pine woods; *T. Umbellus,* or the *White Flesher,* a bird found among poplar woods, and remarkable for the curious beating that it makes with its wings, and always when seated on a fallen tree; another species of *Tetrao,* nearly allied to the last, and probably only a variety of it; *T. Richardsoni*:—this fine bird has been thus named by M. Louis Bonaparte, in honour of Dr. Richardson; it is the largest species that I saw, and appears to be peculiar to the Rocky Mountains; the back of the male is of an uniform dark brown, nearly black, with the breast and under part of a leaden colour, the space round the eyes, which is bare of feathers, is, in this bird, of a yellow colour. The usual station of the male, about the pairing time, is on some rocky eminence, or large stone, where he sits, swelling out his neck, spreading his tail, and repeating the cry, "*Coombe, Coombe,*" in the fine mornings. The hens much resemble the females of *Tetrao canadensis,* and are considerably smaller than the other sex. They live on berries and herbs of various kinds, and are very good eating. Of those species that turn white during winter, I saw three; they were easily distinguishable by one having the whole tail black, another has only two black feathers in it, and the other has a tail entirely white. Neither *Ptarmigans* nor *Willow-Grous* occur among the mountains, and none of the species are migratory; but the winter residents are few in number. The following birds were seen: seven or eight species of *Woodpecker,* the *Golden Winged* species being the only one that migrates; three or four different *Owls;* the *Common Raven,* and the *Corvus canadensis,* (the *Ushashoan* of the Indians;) this bird is very familiar, generally making its appearance wherever you may chance to encamp, attracted doubtless by the hope of finding provisions. It is very fond of the fat of meat, which it will steal, and lay up *encache* for a future

occasion. It begins to build early: I observed a pair collecting materials for a nest on the 18th of March, although the ground was covered at the time with five or six feet depth of snow. The *Lesser Redpoll*, and two species of *Parus* are also winter residents, which is astonishing, as the thermometer often sinks to 50 degrees below zero. One kind of *Falcon*, the *Falco palumbarius*, also remained all the year at the place where I first resided during the winter, on Baptiste River, about 60 or 80 miles from the Rocky Mountains: also the *Snow Bunting*, (*Emberiza nivalis*,) and a kind of *Water Ouzel*, very similar to the British species, but without the white breast. Those birds which are migratory, quit this part of the country about the beginning of October, and reappear in the latter end of April. One of the first to return is the *White Headed Eagle*, and then follow the *Ducks* and *Geese*, with a whole host of small birds. The only songster is a species of *Turdus*, called by the Canadians the *Robin;* it resembles the common thrush, except in having a reddish breast. In the spring of 1826, immense flocks of the *Bohemian* or *Waxen Chatterer* were observed feeding on the berries of *Arbutus Uva-ursi*, but I do not think that they breed here, although a small flock of them was seen on the south branch of the Saskatchawan in June 1827.

The snow-shoe travelling, and the mode of encamping during winter has been so frequently described, that it is quite unnecessary for me to detail them here. One of the principal inducements for fixing upon any particular situation is when it affords dry wood in abundance. The snow is then cleared away with the assistance of the snow-shoes, and trees of a large size having been felled, they are divided into lengths fit for carrying. You may then, after lighting a fire collect a parcel of pine branches, the white spruce and balsam if procurable, are the best, with which a space is covered sufficient for a bed, and proceed to prepare supper. Pemmican is the best and most convenient food to be carried upon a journey. Without a pound of this and a little tea, no one should think of travelling in these desert wilds; it affords an excellent meal, and the hunter may afterwards

prepare for rest by rolling round him the blanket which he always takes with him. If the fire be occasionally renewed, the weather seldom causes much inconvenience. To a person accustomed to all the luxuries a civilized country can afford, this mode of life appears hard and uninviting, but the change takes place gradually, and is therefore but little felt. It seems strange, too, to live entirely on animal food, without any vegetables or salt, but it produces no inconvenience, as I can attest from an experience of about eighteen months, when I enjoyed a state of perfect health.

I found full employment in collecting the productions of the vicinity of Carlton House till the end of May, when Dr. Richardson quitted us to meet Captain Franklin at Cumberland House: thither Captain Back and I and the rest of the Expedition followed him in the beginning of July; but during my stay at Carlton House, I made several short excursions to the South Branch River, which rises considerably farther to the southward than the North Branch, but I did not find a single plant different from what are met with on the latter river. I also ascended the North Branch for upwards of a hundred miles, but saw little that was not equally common nearer to the Fort; from which circumstances, I was induced to conclude that little variation takes place for a considerable distance to the southward. Dr. Richardson having left his servant with me, we embarked in a small canoe on the 14th of July, picking up what specimens we could find along the river, and reached Cumberland House on the morning of the 19th, quite safe. As Captain Back was not yet arrived, I determined upon making an excursion as far north as Beaver Lake, where I added a few common plants to the collection; but as Dr. Richardson had already passed that way twice before, there was little left for me to do. I returned again to Cumberland House, and in a few days Captain Back and Lieutenant Kendall, with the rest of the people belonging to the Expedition, arrived in excellent health, and we immediately began preparing to embark for York Factory, on Hudson's Bay.

As we travelled with much despatch, my collections

received but little accessions of any importance. *Cypripedium arietinum* was found on the portage of the Grand Rapids, at the entrance of Lake Winnipeg; *Weissia calcarea* and *Tortula humilis* on the limestone rocks of the same lake; *Splachnum ampullaceum* was growing between Norway House and the Bay, while *Splachnum vasculosum* and *intermedium*, *Weissia turbinata*, *Cinclidium stygium*, &c. abounded near the Factory. Several phænogamous plants, not previously remarked, were met with, such as *Saxifraga Hirculus*, *Cardamine pratensis*, a species of *Tanacetum*, and two or three *Umbelliferæ*, one of them viviparous, with some *Syngenesious* plants, and *Aralia hispida*, &c. &c.

On the 1st of September, we encountered a dreadful storm in Hudson's Bay, from which we escaped as if by miracle. We had gone to visit the ship, which lay at five or six miles distance from the Fort; the party consisting of Captain Back, Lieutenant Kendall, Mr. D. Douglas, the Doctor belonging to the establishment, and myself, with eight men. On leaving the vessel to return to the Fort in the evening, the wind blew rather freshly, but little danger was apprehended; it suddenly, however, increased to a hurricane, and we were compelled to return if possible to the ship, but after several vain attempts, we found this to be impracticable. We, therefore, threw out an anchor until a boat should be sent to our assistance from the ship. This was immediately done, the boat being furnished with a tow line, and just as it had neared to within twenty or thirty yards of us, our anchor gave way, and we were driven off, at the mercy of the winds and waves. Our masts were almost immediately carried overboard, and after a dreadfully severe, but ineffectual attempt to approach the vessel by dint of rowing, we were compelled to give over, and to submit to being carried out to sea. By this time the water had become very rough, and our little bark was tossed about like an egg-shell, which caused all the men to get sick, and utterly incapacitated them from making the smallest effort to save themselves and us. We continued baling out the water with our hats, as much as we could. Lieutenant Kendall exerted himself to the

utmost, and he succeeded in setting up a temporary mast, which enabled Captain Back to keep the head of the boat to windward, and we continued to drive before the wind farther and farther out to sea. We had already lightened our little skiff by heaving overboard several casks of provision with which she had been loaded, and it was proposed to run her ashore, but most of the party opposed this, and it was resolved to continue out to sea. The night was dark in the extreme, with tremendous thunder and rain, the billows rolling mountains high, and breaking continually over us, which, added to the severe cold, caused us great suffering. Mr. Douglas became dreadfully ill, and the rest were in so benumbed a state, that it was hardly possible to make the necessary exertion to keep the boat from sinking, which could only be done by relieving her constantly from the water as fast as she filled. I shall never forget the sound of the waves as they approached us: sometimes, by the skill of our steersman, we partly avoided them, but much oftener did they dash over us with tremendous fury, and had two of these billows followed in quick succession, our instant destruction would have been inevitable, but by constant baling we kept the boat afloat. The storm continued without abating during the night, and at break of day we found ourselves rapidly drifting towards a lee shore. This we avoided by tacking, and we still continued to drive to sea. Towards the middle of the next day, the hurricane began to diminish a little in violence, but the sea was still dreadfully agitated, and it was not till the middle of the following night that our oars could be of the smallest service to us. At this time we were entirely out of sight of land, without compass to guide our course; the sun, too, was not visible. As the storm diminished, the men recovered from their sickness, and the oars were again plied, and with some success, as it afterwards appeared that we had gone to a distance of 60 or 70 miles in the Bay. With the aid of the tide and our oars we retraced our way back, and never shall I forget the joy that beamed on every countenance when the masts of the ship were again visible. Previous to this we had felt a return

of appetite, which was a sure sign that we considered ourselves comparatively out of danger, and a cask containing oatmeal was quickly broached, which, mixed with a little salt water, sufficed to allay our hunger; but I believe that Lieutenant Kendall and myself were the only partakers. We were soon espied from the ship, and a boat with plenty of provisions was sent to meet us, which proved very acceptable. The news of our having been swept out to sea had been speedily conveyed to the Factory, and Mr. M'Tavish, the Superintendant, lost no time in despatching Indians along each shore of the Bay, with provisions, &c. in case of our being cast ashore alive, for it was not considered possible that an open boat could have weathered so tremendous a storm; but when they found the casks of stores that we had thrown overboard, they almost all returned, and gave us up for lost. On reaching the vessel, we received the kindest attention from our fellow-sufferer, Captain Davidson, and likewise from Mr. M'Tavish, York Factory. Mr. Kendall and Mr. Douglas suffered severely, and did not recover the full use of their limbs until their landing in England. For my own part I endured little inconvenience, comparatively, and after enjoying a night's repose, I was able to take a walk as far as the North River, about five miles distant from the Fort, through a continued swamp the whole way, which was very laborious, for I sank up to my knees at every step, the underneath part of the ground being hard frozen, and the only plant which recompensed me for all my labour was *Polytrichum formosum*. Shortly after, we set sail for England in the Hudson's Bay Company's ship, the Prince of Wales, and having an excellent passage, arrived in London on the 15th of October, 1827, in good health.

I am sorry not to be qualified to speak of the mineral kingdom, and the only opportunity that occurred for investigation was unfortunately lost by spending the winter of 1825–6 distant from the Rocky Mountains. There appears, however, to be little variety; the high mountains consisting principally of primitive limestone on their eastern side. On reaching the Height of Land, these characters change, as the

changes of vegetation may testify, and the mountains are found to be formed of micaceous slate. The Columbia appears to flow through a country exactly similar, as at least one-third of its sand is composed of mica. I observed one large vein of secondary limestone, containing fossils, when crossing the Assinaboyne River, near a considerable waterfall, about 60 miles above its junction with Red-Deer River. The mountains which I explored north of the Smoking River are principally conglomerate sandstone, and below these, the country appears to be sandstone, containing coal, for at least 200 miles to the eastward, as far as Edmonton House on the Saskatchawan. At the eastern extremity of Lake Winnipeg, which is limestone, the primitive rocks again occur, and these probably continue to the sea.

LEDEBOUR'S ILLUSTRATIONS OF RUSSIAN PLANTS.

THIS work, which is so much desired by the scientific botanist, we are happy to learn from the author himself, is in a state of considerable forwardness, and will, under the title of "*Icones Plantarum Novarum vel imperfecte Cognitarum, Floram Rossicam, imprimis Altaicam Illustratantes,*" together with a complete *Flora Altaica,* and an account of the journey, speedily be published.

The *Altaic* plants were collected by the Counsellor of State, Ledebour, assisted by Dr. Bunge and Dr. Meyer, during a journey undertaken at the expense of the Russian Government, with the view to examine the natural productions of the Altaic Mountains, and a portion of the Chinese dominions bordering upon them. During the period that Ledebour was engaged in investigating that part of the *Steppe* situated between the *Ob* and the *Irtysch,* in crossing the lofty mountains to the west and south west of the Altaic range, the valley of the *Tscharysch,* the *Koksun,* the upper *Katunja,* and the *Buchtorma* on the Russian frontiers, the

eastern chain of the Altai were explored by Bunge, who passed a considerable length of time in the districts of the lower *Katunja*, the *Tschuja*, the *Baschkans*, and *Tschulyschman*, thence by the mouth of the river into the *Telezkischen Lake*, or Sea. Meyer, in the meantime, ascended the *Irtysch*, as far as *Noor-Saisan*, by which means he visited the eastern mountains of *Kurtschen*, situated in the Chinese Empire, as well as the *Dolen-kara* and *Ackaul;* thence, crossing it in a westerly direction, he passed through *Somgoripsa*, *Kirgisen steppe*, particularly the territories of *Ablaikit* and *Semipalatinsk*, and passed over the mountainous range of *Tschingistan*, *Kent*, *Ku*, and *Kar-karala*, to the *Altyn-tubé*, and to the sources of the *Nura*.

The "*Icones Plantarum*" will be published at Munich, and will comprise 500 plates in folio, executed in lithography by Seb. Minsinger. It will appear in 10 parts, each of 50 leaves, two of which parts will form a volume. The figures will chiefly represent new plants, discovered in the Altaic mountains and their environs. But a few other species of the Russian Asiatic Flora will also be admitted, which, if they have not altogether escaped the notice of former travellers, have as yet been imperfectly known, and either not at all, or very erroneously represented. The drawings, always made under the immediate inspection of the author, all from perfect and mostly living specimens, exhibit the plants of the natural size; and every where, when necessary, are added accurate and more or less magnified analyses of the parts of fructification. The text, given in Latin, will appear on beautiful vellum paper, and of the same size as the plates, and will be confined to the names, diagnoses, mention of the country, duration, and time of flowering of the plant, characters of the new genera, and explanations of the plates. The more full descriptions will appear in the *Flora Altaica* above mentioned, which will be published in octavo. This work, in three volumes, will enumerate all the plants found on the Altaic Mountains, and in the Steppes which extend along their southern and western bases, and will contain about 1700 species, arranged according to the Linnæan

System, and in the Latin language. The first volume, which is already prepared for the press, includes the first five classes, and amongst them are more than 100 new species.

The narrative of the journey, which is to appear in the German language, gives a full description of the Altaic Mountains, as respects their natural history, statistics, geographical situation, &c. &c. Many observations on the Entomology of the country will be there given, and descriptions of the new species of the Coleopterous tribes.

REMARKS ON THE BOTANY, &c. OF THE BANKS OF SWAN RIVER, ISLE OF BUACHE, BAIE GEOGRAPHE, AND CAPE NATURALISTE.

By Mr. CHARLES FRASER, *Colonial Botanist in New South Wales.*

[THE attention of this country has been of late considerably directed to the Swan River, on the west coast of New Holland, as a suitable situation for a British Colony. Many of our countrymen are already gone with a view to settling there, and grants of land on liberal terms are offered upon certain, but very judicious conditions, by His Majesty's Government. The remarks, therefore, of Mr. Fraser, upon the soil, climate, vegetable productions, aspect of the country, &c. cannot fail to prove interesting to the general reader, as well as to the man of science. Previous to the expedition which Mr. Fraser accompanied, I am not aware that any naturalists, except those of the French Voyage of Discovery, have ever visited the Swan River; and all *their* investigations have been attended with such disastrous circumstances, partly, it would appear, from mismanagement, and partly from natural causes, that their means of observation were thereby very much limited.

Swan River is situated in lat. 32° 4′ 31″ S., long. 115° 46′ 43″ E. of Greenwich, in that part of the west coast of New Holland called Edel's Land. It empties itself into the ocean at one extremity of a semicircular bay, whose other extremity

is formed by Cape Péron; and in front of this bay is a groupe of islands, among which those of Berthollet and Buache are the most remarkable for their size. The river in question was discovered by Vlaming, a Dutchman, and derived its name from the great number of black swans which were seen, and of which that navigator took two to Batavia with him. M. Heirisson, an officer of the Naturaliste, one of Baudin's ships, was the first person who surveyed the river, in June 1801. The mouth he found to be obstructed by a bar of rocks, which threatened to intercept the passage; but after overcoming that difficulty, the depth of water rapidly increased. Pelicans were seen in great numbers, and the strand was covered by molluscous animals, left by the tide, and yielding an abundant food to the aquatic birds. The soil consisted of sand hills, having a line of rocks next the sea, of a calcareous nature, mixed with sand, and full of excavations and clefts. Upon the sand hills ("dunes") grew different shrubs, of which many were in flower; and great flocks of land birds, especially of beautiful parrots, hovering among the trees, seemed to give animation by their presence and numbers to these unknown and desert shores. Soon, in ascending the river, the right bank became lofty, then the left, which was crowned with verdure. The rocks were full of petrifactions. Proceeding past Moreau's Inlet, M. Heirisson enjoyed a beautiful spectacle: on one side was seen the upper course of the river, which could be traced to a table land of distant mountains, whilst on the other its descent was observed as far as the sea. The two banks appeared almost every where covered with noble forests, which extended for a great way into the interior of the country. Continuing, the passage of the river appeared obstructed by shoals and islets, which were named *Heirisson's Isles.* Three days were employed in the ascent, and the return was hastened long before the expedition had reached the source among the hills, by the failure of the stock of provisions. It was Mr. Fraser's lot to examine the course of the river much more accurately, and his account is here given in his own words.—Ed.]

The North and South Heads of the entrance into Swan River are formed of low rocks of fossil limestone, in an advanced state of decomposition; presenting, in many instances, apertures of the most fantastic form, in which are exposed to view masses of roots and trunks of trees of great size.

The soil on the South Head is a barren sand, producing a considerable variety of interesting plants, amongst which I observed *Anigozanthus rufus*, *Anthocercis littorea*, two species of *Metrosideros*, a charming species of *Prostanthera*, producing large quantities of rich blue flowers, a species of *Gnaphalium*, with procumbent stems, the white flowers of which give a snowy appearance to many parts of the cliffs, and a beautiful species of *Dryandra*. The appearance of the *Gnaphalium*, above-mentioned, is in some measure confirmatory of the sandy character which the French give of these hills.

On tracing the river a quarter of a mile from its entrance, on the south bank, I observed quantities of a species of *Brunonia* growing in great luxuriance on the margin of a salt marsh; its flowers of a brilliant sky-blue. Here I likewise gathered a magnificent species of *Melaleuca* with scarlet flowers, and two species of *Metrosideros*, with various other plants, which, from their being neither in flower nor in fruit, I could not attempt to describe.

Half a mile from the entrance, I found the soil, although apparently sterile, to consist of a fine light brown loam, containing a small proportion of sand, and capable of producing any description of light garden crop. This character not only applies to the immediate bank as far as the reach below Pelican Point, but likewise to the hills as far as my observation led. Those hills present the appearance of a petrified forest, from the immense quantity of trunks which protrude for several feet above the surface; and their decomposed state renders them of benefit rather than otherwise to the soil. Here I observed a brown snake, similar to that of Port Jackson, and it is remarkable that this was the only snake seen during the survey.

At the distance of one mile from the mouth of the river, the genus *Eucalyptus* appears, although in a stunted state.

I was much astonished at the beautiful dark green and vigorous appearance of the trees, considering that the season had been evidently unusually dry; but the cause must arise from the great quantity of springs with which this country abounds. On penetrating two feet into the earth, I found the soil perfectly moist, and I feel confident that had I penetrated a foot deeper, I should have found water. On the beach I observed several small pools of water, and many moist spots, which, in seasons of usual humidity, must be the seat of active springs, issuing from the calcareous rocks that bound them. The luxuriance of the vegetation on the immediate beach is truly astonishing. It consists principally of syngenesious plants, and a species of *Hibiscus* with peltate leaves. Here I observed a beautiful pendulous *Leptospermum*, resembling, in its appearance and the situation which it prefers, the weeping willow. An arborescent species of *Acacia* was likewise seen associated with it.

While examining the productions of a mass of cavernous limestone rocks on the beach, I was astonished by observing an extensive spring issue from beneath them, in width about seven feet, running at the rate of three feet in a second. The water was brackish, but is evidently fresh at some periods of the tide. Its elevation is about three feet above low water mark, yet at the lowest ebb its current was at the above rate. The water was found, on being analysed, to be of the same quality as that at Harrowgate.

The soil on the North Head is sandy: its productions much the same as that of the South. Two hundred yards from the beach, the soil changes to a light red loam, improving, as the hills are ascended, to that of a fine virgin earth. The valleys separating these hills are, along the coast, of the richest description, as far as my observations led, and, inland, extending to Pelican Point, beyond which their character was not ascertained. These hills are admirably adapted for the site of a town, their elevated situation commanding a view of the whole of Canning Sound, with the adjacent coast, the interior for some distance, and the meanderings of the river. Their lying open to all breezes, too, is an additional advantage.

The limestone with which these hills are studded, renders them admirably adapted for the production of the vine, and as they are free from timber or brushwood, they may at once be brought into a state of cultivation.

The few trees and shrubs seen on these hills consisted of stunted *Eucalypti* and *Leptosperma*, and a beautiful species of *Calytris*, or *Cypress*, of the finest green colour, producing large warted cones.

On traversing the beach, I was agreeably surprised at the great degree of fragrance imparted by two graceful species of *Metrosideros* then in flower, which exceeded any thing I ever experienced. On the beach I observed a magnificent arborescent species of *Rhagodia*, twenty feet in height, immense quantities of *Gnaphalium*, two species of *Elichrysum*, and a beautiful species of an unknown plant. There were no marine productions observed upon the shore.

From Pelican Point to the entrance of the Moreau, the country is diversified with hills of gentle elevation, and with narrow valleys, magnificently clothed with trees of the richest green. Here the genus *Banksia* appears in all its grandeur, consisting of three species, of which *B. grandis* is the most conspicuous. The principal timber is *Eucalyptus*. The shrubs consist of a species of *Dryandra*, two species of *Hakea*, one of *Grevillea*, and a pendulous species of *Viminaria* of considerable height, richly clothed with yellow and crimson flowers, associating itself in the most graceful manner with the weeping *Leptospermum* formerly alluded to. *Zanthorhœa hastilis* is abundant, as is *Zamia spiralis*, while *Anthocercis littorea* is seen to attain the height of ten feet. The shores are covered with rushes of great height and thickness, concealing many beautiful *syngenesious* plants; but they are occasionally flooded. Here I observed the common *Cassuarina* of Port Jackson, though with a stunted habit. These beds of rushes are probably the rendezvous of the *Dugong*, mentioned by Mons. Péron, but of which we saw none.

On examining the shoal water of Pelican Point, I observed an aquatic *stoloniferous* species of *Goodenia*, with which the sandy bottom is covered.

The soil between the above points resembles, in its surface, the sandy soil of the shores of Port Jackson, more than any hitherto seen; but, on digging a few inches, it is found to contain a considerable proportion of loam. The valleys and head lands furnish an excellent soil, more particularly that of Garden Point. Here we planted several *Bananas*, and seeds of all sorts of culinary vegetables. This Point produces an immense quantity of herbaceous plants, amongst which I observed a *pulverulent* species of *Goodenia*, and a species of *Centaurea*.

The botany of Point Heathcote is splendid, consisting of magnificent *Banksias* and *Dryandras*, a remarkable species of *Hakea*, two species of *Grevillea*, a species of *Leptospermum*, and a beautiful dwarf species of *Calytris*. Here we came to great abundance of fresh water on the beach, by scratching the sand with our fingers, within two inches of low water mark. The beach at Garden Point is of the same character, and I doubt not but every beach within the heads will be found of the same description. This was afterwards found to be the case, not only on the river, but on the beaches of the islands of Buache and of Berthollet.

The view from Pelican Point is exceedingly grand; the contrast between the dark blue of the distant mountains and the vivid green of the surrounding forests, is such as must in a peculiar manner strike the attention of a person long accustomed to the monotonous brown of the vegetation of Port Jackson. It is indeed materially different from any thing I have yet seen in New South Wales.

From Point Heathcote to the islands, the country seems to improve, as far as I could judge from the immense quantity of herbage it produced.

Point Belches, on the opposite shore, the only spot of that shore examined, was found to produce *Banksias* and *Eucalyptas*. The shrubs consisted of a beautiful *Isopogon*, a species of *Acacia*, and a *Jacksonia*, with crimson flowers, together with the general productions of the opposite shore. The soil is sandy, and the cliffs, which are of very considerable elevation, are formed of fossil, lime and sandstone. The view from

this point of the meanderings of the river and the Moreau, with the surrounding country and distant mountains, is particularly grand. This seems to be the extreme easterly boundary of the limestone.

The islands on the flats are composed of a rich deposite carried down by the floods. Their margins are covered with *Metrosideros* and *Cassuarina*, and their interior with sea-side succulent plants. On one of these islands I caught sight of a plant with an arborescent habit, which, on examination, proved to be a species of *Zamia*, with spiral fruit, differing only from *Z. spiralis* in habit. Here the *equatorial Goodenia*, formerly alluded to, disappears. The difficulties which the party now experienced from having mistaken the channel, and in having consequently to drag the boats over the mud, were great, but by perseverance were overcome. From the extensive beds of oyster shells, which lie a foot deep in soft mud, our feet became dreadfully lacerated. These flats are extensive, but by employing flat bottomed boats they may be easily crossed.

At Point Fraser, the bank may be said to terminate, and the channel appears to be that of a beautiful inland river. From the entrance to this spot, it may be more properly called an estuary. The flats, or levels, at this point are very fertile, composed of a rich alluvial deposite, but evidently occasionally flooded—drift timber having been seen five feet above the surface. Here are extensive salt marshes, admirably adapted to the growth of cotton.* The hills on the bank of the river are exceedingly barren, resembling those of Port Jackson, but producing a magnificent species of *Angophora*, which seems to assume the same situation in the botany of this tract as the genus *Eucalyptus* does in that of Port Jackson. *Banksia grandis* was here seen to attain the

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* This has already been produced at Sydney, and pronounced by the ablest judges in Britain to be of a very superior quality. There can be no question, but that, both as to soil and climate, the banks of the Swan River would prove better adapted to the cultivation of this plant than Port Jackson, and the seed that should be tried is that of the *Sea Island Cotton.*—*Ed.*

height of fifty feet, and its trunk frequently exceeded two feet and a half in diameter.

Amongst the new botany of this tract may be enumerated a species of *Metrosideros* of great elegance, forming thickets on the flats, and intermingling with two other species of the same genus, but of less beauty. Its flowers are of the most brilliant scarlet: the general height of the plant six feet. There were also a pink-flowered handsome species of *Centaurea*, a remarkable dwarf species of *Hakea*, two species of *Daviesia* and *Dryandra armata*.

I observed a species of *Psittacus*, (*Cockatoo*,) in large flocks, whose voice is more plaintive than that of the *white cockatoo*. It feeds on the roots of *Orchideous* plants, to obtain which it scratches the ground to a considerable depth.

While attending to a boat in the river, which the party were dragging over the mud, I distinctly heard the bellowing of some huge animal, similar to that of an ox, proceeding from an extensive marsh farther up the river. (Could this be the *Dugong* * of the French?) Immediately afterwards I

* The *Dugong*, or *Dougong*, of the French, is the *Trichecus Dugong* of Gmelin, an inhabitant of the Indian seas, but is not, that I am aware, found in the part of New Holland visited by Mr. Fraser. The animal whose bellowing he heard, was unquestionably the *Phoca proboscidea* (now made the genus *Macrorhinus*) of Péron's *Voyage aux Terres Australes*, v. 2. p. 34. t. 32. The *Phoque à trompe*, *Eléphant marin*, *Bottle-nosed Seal*, *Sea-Lion* of Anson's Voyage. The French Voyagers heard it in the same river, and, as it appears, for the first time. They were descending the river, overpowered with misfortune and fatigue, and want of food. In the midst of their dangers, night came on. "Nous nous disposions à mettre pied a terre pour nous sêcher et réparer notre vigeur éteinte, lorsque tout-à-coup un hurlement terrible vint nous glacer de terreur; il etait semblable au mugissement d'un bœuf, mais beaucaup plus fort, et paroissoit sortir des roseaux voisins. A ce cri redoubtable, nous perdîmes toute envie de descendre a terre et quoique transis de froid, nous préférâmes passer la nuit sur l'eau, sans souper et sans pouvoir fermer l'œil, a cause de la pluie et du froid." v. 1. p. 183. Their alarm would probably have been still greater, could they have formed an idea of the size of the animal, which is from twenty-five to thirty feet in length: and it herds in such numbers that the whole shore of the bottom of a bay has been seen covered with them, giving the appearance, at a little distance, of masses of black rock. The remarkable feature of the animal is, that, in the male, the nostrils, which, at rest, are

was visited by three natives, armed: they made signs for me to depart, but offered no violence. On hearing the voices of the party they retired into the woods.

One mile up the river, from the last point, is a small creek of fresh water issuing from an extensive lagoon clothed with arborescent species of *Metrosideros* of great beauty. The banks are covered with the most interesting plants, amongst which I observed two species of *Calytris*, a species of *Acacia*, with a scolopendrous stem, and several *Papilionaceous* plants. The *Angophoras* on the flats are gigantic. Those flats are formed of tolerable loam of great depth and capable of producing fair crops.

The *Zamia*, seen from the islands, was here observed to attain the height of thirty feet. *Zanthorhæa arborea*, too, was of equal size, and, associated with the splendid *Banksias*, imparted to the forest a character perfectly tropical.

I was astonished at observing the facility with which water was obtained in this apparently sterile tract: for, on digging to the depth of three feet, water was found in abundance, and of the best quality.

Proceeding up the river from the above-mentioned creek, the country assumes a distinct appearance from that seen below. On the left is an extensive salt marsh, bordered by thickets of *Cassuarina*, surrounded by a flat of the richest description, rivalling, in point of soil, that of the Hawkesbury. Here I first observed the *Brome* or *Kangaroo grass* of New

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flaccid and pendent, when the animal is irritated are protruded to the length of a foot, then resembling the trunk of the elephant, whence one of its French names. Notwithstanding, however, the vast size and consequent strength of these animals, and notwithstanding that they have among themselves the most terrible and bloody conflicts, which exhibit a truly extraordinary spectacle, they are, in general, extremely mild and gentle. Man may walk in the midst of them without any reason to apprehend the smallest danger; and they only defend themselves when attacked. They are caught abundantly for their oil, especially by English fishermen; one of whom has been known to make a pet of one of these amphibious monsters, to caress it daily, and even to ride upon its back. For a full history of this singular animal, see Péron's Voyage, v. 2. chap. 23.—*Ed.*

South Wales in great luxuriance, (with the exception of some seen on the banks at Point Fraser.) *Bastard* and real *Blue Gum* is seen here in considerable quantities and of great size. The opposite bank is high, and covered with *Eucalyptus* and *Banksia*—the soil a light sandy loam.

From the above point, the country resembles, in its features, that which borders all the rivers of New South Wales whose course is west of the Blue Mountains, varying alternately on each bank into hilly points and extensive flats. The hills are covered with magnificent *Angophoras*, *Zamias*, and *Zanthorhæa*. The soil a rich red loam of very great depth, throwing up a luxuriant herbage, amongst which I observed *Anigozanthus rufa*, *Clematis aristata*, and a beautiful species of *Borya*. (?) The flats, which are composed of the richest brown loam, equal to any on the east coast, are thinly studded with gigantic *Blue Gums*, and occasional stripes of suffrutescent *Acacias* and papilionaceous shrubs, occupying in this country the same situation in the geography of its botany as the *Green Wattle* in that of New South Wales. *Banksia* and *Zamia* are still seen on the high lands.

It is worthy of remark, that, in New South Wales, the presence of *Banksia*, *Zamia*, and *Zanthorhæa* are considered sure criterions of a bad soil, and such being the impression on my mind, I pronounced all the land on which they were seen to grow to be sterile, until I examined a ridge on the banks, producing them in great luxuriance; when, to my astonishment, I found the soil to be a red earth of great depth, producing the most luxuriant *Brome grass*.

In proportion as we ascend the river, the flats increase in breadth and luxuriance, each being backed by a terrace of forest land of the finest description, extending for miles from the river, and resembling in character those seen on the banks of the Macquarie River, west of Wellington Valley. On farther observation, towards the source of the river, those flats were seen to extend to the base of the mountains, interspersed with stripes of good forest land, on which I observed a considerable portion of *stringy bark*. The variety of plants seen on this tract was great: amongst the new ones observed,

I may enumerate seven species of *Hakea*, a species of *Lambertia*, four species of *Isopogon*, three species of *Leptospermum*, a species of *Petrophila*, and a liliacious plant not seen in flower. *Banksia grandis* was remarked in a stunted state.

The base of the mountains, (which was named Darling's Range, in honour of General Darling,) is covered with fragments of quartz and chalcedony; the soil a red sandy loam. Here I observed a species of *Hakea* with holly-shaped leaves. Farther up, the soil improves to a light brown loam, but, from its rocky nature, is incapable of cultivation. I saw a beautiful species of *Dryandra*, a species of *Hakea*, and several syngenesious plants. The summit of the mountain is studded with noble *Angophoras*. Here too I found a beautiful species of *Arthropodium*, with filiform leaves, an arborescent species of *Hakea*, a species of *Dryandra*, and two species of *Isopogon*. The view from this summit is extensive, resembling that seen from Princess Charlotte's Valley, which I witnessed in 1817, (vide Oxley's Journal,) but divested of the permanent swamps. The highest part of the range is of ironstone, and it is remarkable that there is no underwood. The ranges are of equal height, so that no view could be had to the eastward.

At the source of the river, I observed thickets of an arborescent species of *Acacia*, and gigantic *thistles*, eleven feet in height. Here I found a magnificent species of *Hibiscus*, with brilliant sky-blue flowers, and a species of *Euphorbia*. The ridges on the banks are perforated with immense numbers of deep pits, the origin or cause of which we could not at first ascertain. They proved to be made by the natives for the purpose of catching land tortoises, with which those ridges abound.

We found the river to be navigable until it almost ceases to be a stream, or where there was not room for a boat to pass. The water is fresh sixteen miles below its navigable source, and that at the end of a very dry season; what, therefore, must it be in a wet season? Mons. Freycinet states that he found no fresh water, although he was in the country during the rains, a decisive proof that we must have penetrated at least twenty-five miles higher than he did. We

saw nothing of the lake laid down by him, and judge it to be a swamp. The supply of water from under-ground springs into the river must be immense, for it is impossible that the springs at the source could furnish such a quantity of fresh water. The tide at the entrance of Swan River was not observed to rise above two feet, even at spring tides, and at the source it was hardly observable.

The climate during our stay was the most delightful I ever experienced; the thermometer seldom ranging above 85°. The nights agreeably cool. The sea breezes set in at two hours after sunrise, and cease at sunset, when they are immediately succeeded by the land breeze, which, even in February, is so agreeable that, while surveying the river, we preferred sleeping in the open air to lodging in tents.

The quantity of black swans, ducks, pelicans, and aquatic birds seen on the river was truly astonishing. Without any exaggeration, I have seen a number of black swans which could not be estimated at less than five hundred rise at once, exhibiting a spectacle which, if the size and colour of the bird be taken into account, and the noise and rustling occasioned by the flapping of their wings, previous to their rising, is quite unique in its kind. We frequently had from twelve to fifteen of them in the boats, and the crews thought nothing of devouring eight roasted swans in a day. The animals are the same as in New South Wales: the *Kangaroo*, *Emu*, *Native dog*, &c. &c. Fish were abundant, and the sound swarmed with *Tiger Sharks*.

The few natives which we saw were not disposed to behave ill; on the contrary, they seemed alarmed much at first, but soon gained confidence. We gave them some black swans, which they eagerly accepted, and we dressed several of them in the old jackets of our marines. They had indeed a most ludicrous appearance, and seemed like men in shackles. It is worthy of remark, that these savages have no means of navigation, and rather show a horror of the water. Their arms are the same as those of the natives of New South Wales, their clothing and appearance equally loathsome.

The advantages which this country holds out to settlers,

above those of New South Wales, besides the important circumstance of its vicinity to India, the Spice Islands, Java, the Mauritius, and the Cape of Good Hope, and independent of its situation as a place of call for East India and China ships, are, in the first place; The great ease with which a settler can bring his land into cultivation—the forests averaging not more than from eight to ten trees to an acre. Secondly; The facility with which he can bring his produce to market, either by land or water; the coast being of easy access on any part near the river, and no impediments existing in the interior. Thirdly; The great abundance of fresh water of the best quality, an advantage which New South Wales, east of the Blue Mountains, does not possess, excepting on the immediate banks of the rivers and creeks. Fourthly; The great abundance of limestone.

Ten miles from the entrance of Swan River, the Moreau of the French branches off to the south, according to the report of the party who went to explore it. It seems of equal extent with the Swan River, and the country on its banks of the same description.

The island of Berthollet, distant six miles from Buache, is a barren inhospitable spot, producing abundance of hares, seals, and mutton birds. Its shores present many tesselated cliffs of limestone resembling the turrets of a Gothic cathedral. There is no water on this island.

The island of Buache is composed principally of low ridges of light sandy loam, traversing the island from north to south, and terminating on the south with high cliffs or banks of sand, the loftiest parts of which are thickly covered with *Cypress*, (*Calytris*) and the surface towards the sea is considerably interrupted by limestone rocks. The soil, though light, appears to me, from the immense thickets of a species of *Solanum* which it produces, and which attains the height of ten feet, to be capable of producing any description of light garden crops. The interior of those ridges are singularly divided by transverse dykes or banks, forming deep pits, which receive all the water from the ridges; the dykes preventing its escape otherwise than by

absorption. These pits are covered with gigantic *Solana*, and a beautiful species of *Brunonia*. Fresh water may be found in each of these islands by digging two feet deep. The north side of the island is in many places covered with extensive thickets of arborescent *Metrosideros*, and the soil I found to be of a very fine brown loam, studded with detached blocks of limestone, and susceptible of producing any description of crop. In one of those thickets we sowed various sorts of culinary seeds, and introduced several plants of the *Banana*.

The coast towards Port Cockburn is thickly studded with cypress, the soil a light sand. Here we found abundance of fresh water on the beach, as well as in cypress thickets beyond the influence of the sea. My observations did not extend beyond Port Cockburn, but from the appearance of the country I doubt not its being of the same quality as that already described.

Between the isles of Berthollet and Buache is the entrance for ships drawing more than sixteen feet water into Port Cockburn. Vessels drawing less than sixteen feet can run directly across the sound, from the entrance of Swan River to Port Cochrane. Vessels of any burthen can proceed up the sound to the entrance of the river, where there is good anchorage, with plenty of room to beat out, should the wind come to blow hard from the north-west. The sound is locked in on all points, excepting from north to north-west.

It is remarkable, that, on the shores of the sound at the entrance of the river, there is not a perpendicular height of five feet from the line of low water to that of vegetation, a proof that there is never any very heavy weather in the sound. There is no surf, and boats may land on any part of the main. On the bar, at the entrance, there is only one fathom of water, but that is always smooth. Port Cockburn is distant only eight miles from it, where there is room for the largest fleet, with seven fathoms water within twenty yards of the shore, and this perfectly land-locked.

Proceeding from the mouth of the river along Bay Geographe, the appearance of the country is particularly pleasing.

The shore seems well clothed with timber, and the foliage is of the richest green. The observations taken here confirm me in my opinion that the principal part of the timber consists of *Eucalyptus*. I saw no traces of *Banksia* nor of *Cassuarina*.

From the shore the country is seen to rise gradually into gentle undulating hills, separated, apparently, by valleys of considerable size; the whole terminated by a magnificent range of hills, thickly covered with heavy timber extending all along the bay.

At the head of the bay the feature of the country changes: exhibiting bold hills, with large masses of granite, in many instances jutting into the sea with considerable grandeur. The hills, too, are clear of timber, with the exception of some stunted *Eucalyptus*, and are divided by beautiful winding valleys, in each of which is a small stream and a soil of the richest loam, throwing up immense quantities of herbaceous plants, amongst which I observed thistles of eleven feet in height. I found the soil, on examination, to exceed ten feet in depth. On digging the sand on the beach we found abundance of fresh water, and the soil with which the hills are covered is of the finest description to the very summit.

At Cape Naturaliste, the character of the soil continues without any visible change, but in the geological structure there is a very great difference. Here are immense cliffs, presenting at their base large beds of granite and schistose rock, passing alternately into each other, and observing in their dip an angle of fifteen degrees. They were seen occasionally to inclose immense masses of puddingstone, and an extraordinary aggregate containing petrifactions of bivalve shells, and other marine productions, every part of which was covered with minute crystals of lime. Large masses of feldtspar were seen traversing those beds in various directions and of various thickness. The granite rock was succeeded by a bed of micaceous schist, in an advanced state of decomposition, over which were observed several caverns, which were found to contain rock-salt in crystalized masses and in large quantities. The rock is decomposed puddingstone, containing various sorts of granite; the salt having

penetrated the most compact parts of the granite. The base of the cavern is a coarse sandstone, the whole covered with limestone.

The southern extreme of the Cape consists of lofty cliffs, presenting two ranges of superb caverns: the lowest of which we explored. The great or outer cavern is about forty feet high at the entrance, forty feet in breadth, and about ninety feet in depth, into which the sea rolls at high-water, over immense blocks of granite, and in awful grandeur. The stalactites in this cavern are many of them from twenty to twenty-five feet in length, covered with minute *Cryptogamic* vegetables of fantastic colours and form. The walls of the cavern are clothed with the same substances, which give to the whole an extraordinary appearance. The second cavern is distinct from the first. The entrance is about twenty feet in height, and twenty in breadth, increasing in height and breadth farther in. The stalactites and stalagmites in this cavern are abundant, and of the purest white. The former were observed often to exceed fifteen feet in length. There was a remarkable circumstance observed at the entrance of this cavern: the stalactites were all bent outwards, as if a gale of wind was perpetually blowing through the cavern. The three succeeding caverns are of minor importance, but all containing stalactites. The appearance of the cliffs and caverns from the sea is exceedingly grand. It is impossible to pass along the beach fourteen yards without crossing a stream which issues from caverns of limestone, and which forms banks of shells, sea-weed, stones, and whatever substances may come within their reach, incrusting them in a most beautiful manner.

Such, indeed, were the attractions of the country, that we all felt sorry on leaving it.

CHARLES FRASER.

[TAB. LI. LII. LIII. LIV.]

JOURNAL OF A TWO MONTHS' RESIDENCE ON THE BANKS OF THE RIVERS BRISBANE AND LOGAN, ON THE EAST COAST OF NEW HOLLAND. BY C. FRASER, COLONIAL BOTANIST.

To which are added, Figures and Descriptions of a few of the most Interesting Plants.

MORETON BAY, situated in latitude 27° South, was so named, if I mistake not, by Capt. Cook, surveyed by Capt. Flinders, and farther explored by Mr. Oxley, who discovered a fine fresh-water river flowing into the Bay, and which, "from respect to his Excellency the Governor, under whose orders the Bay was examined, was honoured with the name of Brisbane River." * A settlement was subsequently formed there, bearing the name of Brisbane Town. It is to Sir Thomas Brisbane that I am indebted for some information relative to this country, which may be considered prefatory to the remarks of Mr. Fraser. Sir Thomas's letter is dated Mackerstane Castle, 3d Nov. 1829.

"I visited," he says, "Moreton Bay in 1824. It is situated about 600 miles north of Sydney, and forms one of three Penal Settlements, *viz.* Port Macquarrie, 165 miles north of Sydney, that already named, and Norfolk Island, nearly 1000 miles E. N. E. of Sydney. The Penal Settlements are for the purpose of receiving and trying to reclaim convicts who have committed crimes after their transportation; and according to the nature of the offence they are sent—for the slighter ones to Port Macquarrie; for those of a graver nature to Moreton Bay; and, finally, on committing those of the deepest dye, to Norfolk Island, which last is occupied with the most desperate characters, and are either capital respites, or recorded sentences of death. These unfortunate individuals

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* Mr. Oxley's Report, published in Mr. Barron Field's Memoirs of New South Wales.

are employed in clearing the country, in the first place, for the immediate wants of the settlement, and when that is accomplished, they go in order to prepare it for settlers, as has been done in the case of Newcastle, only 65 miles north of Sydney, which was cleared by culprits, but which, in 1823, I gave up to free settlers from England, and it is now one of the richest and best districts of the country. To escape from these Penal Settlements is almost hopeless, as they are surrounded by ferocious races of people, who would murder an Europæan for any part of his clothing or appointments. In the same manner, and at no remote period from the colonizing of New South Wales, that of Port Macquarrie will be made over to the settlers, and also Moreton Bay, which will require the local government to grant settlements still farther north upon the coast. It is remarkable how much better the condition of the aboriginal inhabitants appears upon the coast than it is in the interior. While at Moreton Bay, I fell in with natives who had never seen an Europæan. One old chief put his hand all over my arm and shoulder to feel if my clothes were part of myself, when the ecstacy of some was beyond my powers of description. They had no weapons but long spears, and perhaps, if left to themselves, would not arrive at the possession of bows and arrows for some centuries. They had never seen iron or steel, and when I presented them with tomahawks, knives, and scissors, it produced the most extraordinary surprise, one of the natives throwing himself down on the sand, rolling over and over, roaring and making a hideous noise, but all through pure delight."

Mr. Fraser, as Colonial Botanist, was directed to establish a public garden at Brisbane Town, to collect the vegetable products of the country, to make observations on their uses and importance, especially on the forest trees, and to report on the nature of the soil, and to what extent it is fitted for agricultural purposes, or grazing. How far this zealous naturalist has succeeded in the object of his mission will appear, in part, from the following journal: and our gardens in this country, especially those of Glasgow, Edinburgh, and

Liverpool, and the pages of the Botanical Magazine will testify how successful he has been in discovering new plants. The dried specimens from this part of New Holland, in particular, which he has communicated to me, are both numerous and valuable, and the future pages of this work will, I trust, contain the figures and descriptions of many of them. Mr. Allan Cunningham, the able botanist attached to the Royal Gardens of Kew, was engaged at the same time, and with the same object, in exploring the vegetable riches of this novel country; and their united collections, whenever they shall be published, will add greatly to our knowledge of the botany of Australia.—*W. J. H.*

June 30*th*, 1828.—Arrived at Amity Point, Moreton Bay, in the ship Lucy Ann, and cast anchor in Rainbow Reach, after a passage of twenty-three days from Port-Jackson.

July 1*st*.—At seven o'clock in the morning, proceeded across Moreton Bay, in company with Mr. Allan Cunningham, the Government Botanist, and entered the Brisbane River at ten o'clock, where we landed for an hour and refreshed the men, and then reached Brisbane Town at three o'clock.

The banks of this river, until arriving at the islands, are clothed with *Mangroves, Casuarinæ,* and *Banksia Compar,* entwined with many thick climbers, and containing several interesting plants. Above the islands, the *Casuarina* disappears, and is succeeded by *Gum Trees,* (*Eucalypti,*) and extensive brushwoods, the latter exhibiting a profusion of *Yellow Wood,* (*Oxleya xanthoxyla,**) and *Tulip Wood,* a few straggling *Araucariæ, Flindersia australis,* and many other interesting timber trees, together with a vast variety of shrubs. The hills that rise behind the copses are open and stony, tolerably covered with grass, and with a few scattered *Gum Trees.*

On approaching Brisbane Town, the banks of the river become more elevated and rocky. The north side is formed

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* See page 246.

of quartz rock and ironstone, the south of a peculiarly composed basaltic stratum, of which the basis is bright pink-coloured, with white spots: it is remarkably hard, and breaks into square blocks, and is used for the foundations of buildings at Brisbane Town, being reckoned exceedingly durable.

July 2d.—At nine o'clock, crossed the river to examine some dense forests on its southern bank, where I succeeded in collecting four species of *Capparis, Carissa ovata, Exocarpus latifolia, Dendrobium tetragonum,* and another new species. Here the *Acrostichum grande* * (of Cunningham) forms a most striking feature. On my return to Brisbane Town in the afternoon, I accompanied Capt. Logan to the intended site of the New Garden, where we felled a magnificent tree of *Flindersia australis,* loaded with ripe fruit.

July 3d.—Employed this day in laying down the boundaries of the New Garden, and fixing the situation of a large pond in its centre.

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* This is indeed a most singular plant, which Mr. Fraser farther notices in his letter to me, dated Sydney, 5th Feb. of this present year, 1829. "In a case," he says, "I have sent you a package of specimens of that superb *Acrostichum, grande* of Mr. Cunningham. To admit their fronds between paper of the largest atlas size, I have been obliged to divide them into very many portions or sections. The colour is a bright pea-geeen, that of the seeds a light brown. The plant is found parasitic on all descriptions of trees in the forests on the banks of the rivers Brisbane and Hastings, the latter (in lat. 31° 20″ South) being its extreme southern range." The *nidus,* if I may so call it, or the base with the roots of one of these gigantic *Acrosticha,* was sent also, which in shape resembles a little punt or boat, having a completely convex lower surface, from the numerous ascending scales or old remains of former years' fronds; and it is in itself quite a curiosity. With regard to the species, it approaches very nearly, if it be not actually the same with the *Platycerium biforme* of Blume, in his splendid Flora of Java, v. 1. p. 44. t. 18. That author found it growing on stems of *Arenga saccharifera* of Labill. in Java, but only once was able to discover a fertile frond, and that at the foot of the mountain *Gunung Seribu.* Again, it seems to be identical with the *Acrostichum fuciforme, Wall.,* found by Dr. Wallich at Singapore.

Seeds of it are sown in the Glasgow Botanic Garden, and if we are successful in raising plants from them, it would of all Ferns be the one most worthy of cultivation in our stoves.

July 4th.—Accompanied Capt. Logan to examine a forest on the banks of a stream called Breakfast Creek, three miles north-west of Brisbane Town, noted for its gigantic timber, and the vast variety of its plants. In this interesting forest I observed several species of *Ficus*, upwards of 150 feet high, enclosing immense *Iron Bark Trees*, on which, originally, the seeds of these *Fig trees* had been deposited by birds. Here they had immediately vegetated, and thrown out their parasitical and rapacious roots, which adhering close to the bark of the *Iron Tree*, had followed the course of its stem downwards to the earth, where, once arrived, their progress of growth is truly astonishing. The roots of the *Ficus* then increase rapidly in number, envelope the *Iron Bark*, and send out, at the same time, such gigantic branches, that it is not unusual to see the original tree, at a height of 70 or 80 feet, peeping through the Fig, as if itself were the parasite on the real intruder.

In the singular angles, or *Walls*, as they are here termed, which are formed by the roots of these trees, and of which I observed many sixteen feet high, there is room enough to dine half-a-dozen persons. The fruit is eagerly sought by *Regent Birds*, (*Sericulus chrysocephalus*,) *Blue Pigeons*, and *Swamp Pheasants* (*Cuculus Phasianus*,) and the spreading and massy boughs support a number of superb parasitical plants.

This forest abounds in *Urtica Gigas*, as well as in an unpublished and most interesting new plant,* producing fruit

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* CASTANOSPERMUM AUSTRALE.

DECANDRIA MONOGYNIA. Nat. Ord. LEGUMINOSÆ.

DIV. CASSIEÆ? *De Cand.*

GEN. CHAR. CASTANOSPERMUM. *Cunningham.* *Cal.* coloratus, subilabiatus, brevi-tubulosus, labio superiore bifido, inferiore trifido. *Pet.* 5, papilionacea, alis carinaque subæqualibus. *Stam.* 10, libera. *Germen* longe stipitatum. *Legumen* stipitatum, grossum, oblongo-cylindraceum, bivalve, subtetraspermum: valvis coriaceis intus spongiosis. Arbor *procera.* Folia *imparipinnata.* Racemi *laterales, subcompositi.*

C. australe. *Cunningham et Fraser, MSS.*—(TAB. LI. LII.)

larger than a *Spanish Chestnut*, by which name it is here known. The *legumens* are large, solitary, and pendent, produced by the two-year-old wood: the *leaves* are impari-pinnate, each several leaflet being oval, lanceolate, and of a rich green, and the shade afforded by the whole tree excels any I have hitherto seen in New South Wales. By the natives

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HAB. In rivos fluminis "Brisbane" dicti, Novæ Hollandiæ. *D. A. Cunningham et D. C. Fraser.*

Arbor 30–40-ped. et ultra, cortice cinereo ruguloso obtecta, dense foliosa. *Folia* pallide viridia, spithamæa, fere ad pedalem, impari-pinnata; foliolis elliptico-ovatis, subacuminatis, integerrimis, glabris, parallelim venosis, plerumque alternantibus. *Racemi* e ramis vetustioribus progredientes, solitarii vel aggregati, digitales, simplices vel subcompositi. *Pedunculi*, pedicellique vix unciam longi, glabri. *Calyx* brevis, tubulosus, coloratus, vix distincte bilabiatus, labio superiore dentibus duobus, inferiore tribus, subæqualibus. *Petala* 5, crocea, perigyna, papilionacea, calyce 4-plo longiora, subconniventia. *Vexillum* obovatum, unguiculatum, lateribus deflexis. *Alæ* vexillo vix breviores, lineari-oblongæ, basi attenuatæ, subincurvæ. *Carina* e petalis duobus liberis, alis simillimis, et vix brevioribus. *Stamina* 10, perigyna, exserta. *Filamenta* omnia libera, filiformia. *Antheræ* dorsi medio affixæ, oblongæ, biloculares, marginem versus dehiscentes. *Germen* angustum, planum, longe stipitatum, curvatum, glabrum, superne in stylo stipitis longitudine attenuatum. *Stigma* simplex. *Legumen* magnum, spithamæum et ultra, stipitatum, oblongo-cylindraceum, pallide fuscum, glabrum, bivalve, valvis coriaceis crassis intus pulposis. *Semina* 3–5 magna, depresso-globosa, fusca, nitida, iis *Castaneæ vescæ* simillima. *Hilum* lineare, pallidum. *Albumen* nullum. *Embryo* semini conformis, pallide flavo-virescens, extus paululum rugulosus. *Cotyledones* magnæ, hemisphæricæ. *Radicula* supera, erecta, exserta; *plumula* parva, conica.

Not only have I received excellent specimens of this rare plant through the kindness of Mr. Fraser and of Mr. Telfair, by way of the Mauritius, but the former of these gentlemen has sent seeds to our Glasgow Botanic Garden, which, from their fresh appearance, give us the prospect of their vegetating. In the Mauritius the plant will probably flourish as in its native soil, under Mr. Telfair's fostering care. Although the large and handsome seeds are eaten by the natives of Brisbane River, and by the convicts in that part of our colony, as substitutes for our Spanish chestnuts, I have found them hard, bitter, and their flavour not unlike that of the acorn.

TAB. LI. *Fig.* 1, Portion of an old branch, with a raceme of flowers. *Fig.* 2, Leaf:—*nat. size.* *Fig.* 3, Anther. *Fig.* 4, Pistil:—*magnified.*

TAB. LII. *Fig.* 1, Portion of a legume, partly opened, and showing the seeds lodged in a white pulp. *Fig.* 2, Seed. *Fig.* 3, Embryo. *Fig.* 4, Do. with a portion of one of the cotyledons to show the radicle more distinctly, and the plumule:—*all of the nat. size.*—*W. J. H.*

the fruit is eaten on all occasions; it has, when roasted, the flavour of a Spanish chestnut, and I have been assured by Europæans who have subsisted on it exclusively for two days, that no other unpleasant effect was the result than a slight pain in the bowels, and that only when it was eaten raw.

The country intervening between Breakfast Creek and Brisbane Town is hilly, the higher grounds stony, but the vallies fertile, and abounding in water. We reached the town again at six o'clock.

July 5th.—This day was appropriated to the examination of a valley N. E. from Brisbane Town, by which this settlement is at present supplied with water. In this spot, which I found most fertile, was shown to me an extraordinary *Cemetery,* if it may be so termed, of the aboriginal natives. It consisted of the hollow trunk of a dead *Eucalyptus,* in which were deposited human bones of all ages, consisting of leg, thigh, and arm bones, vertebræ, and some fragments of crania, all mingled together. I was informed that many of the skulls had been previously carried away by scientific persons. The hills are covered with nodules of quartz: their timber consisting of *Eucalyptus* and *Casuarina.*

July 6th.—At ten o'clock I proceeded with Captain Logan and Mr. Cunningham to the southern extremity of Glenmoriston's Range.

The country which lies between Brisbane Town and the base of this range, is, to the north of the river, hilly, sterile, and devoid of interest. On ascending the high ground, the soil and grass improve, and continue to do so till the very summit of the range, which is clothed with *Tristania robusta, Eucalyptus,* and the *Forest Oak,* (*Casuarina torulosa*:) the native *Cherry* (*Exocarpus cupressiformis,*) also abounds here. On the summit was observed a remarkable tree of the *Urtica* family, which appears to be a new genus. In habit it resembles a tall *Weeping Willow,* * the fruit hanging in pendulous

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* GYROSTEMON ATTENUATUM.

DIŒCIA POLYANDRIA. Nat. Ord. URTICEÆ?

GEN. CHAR. *Flores* dioici. MASC. *Perianthium* monophyllum, lobatum inte-

clusters on the year-old wood; the foliage lanceolate and undulated. In the course of this day's excursion, we

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grumve. *Stam.* numerosa, in gyros plures concentricos disposita. *Anth.* sessiles, cuneatæ, subquadrilobæ, biloculares, longitudinaliter dehiscentes. Fæm. *Perianthium* ut in mare. *Pistillum* subcyathiforme, e germinibus numerosis circa axin cyathiformem arcte dispositis: stylis totidem, nonnunquam obsoletis. *Ovula* 2–4. *Fructus* cyathiformis, e capsulis vel carpellis numerosis arcte compressis membranaceis "bivalvibus," plerumque, ovulis abortientibus, monospermis. *Semen* axi centrali fructus, angulo superiori loculi affixum, reniforme, tuberculato-rugosum. *Albumen* carnosum, subtenue. *Embryo* curvatus, cylindraceus. *Radicula* infera. *Cotyledones* lineares.

G. attenuatum; foliis lanceolatis longe petiolatis basi apiceque longe attenuatis. (Tab. LIII.)

Codonocarpus australis. *Cunningham, MSS.*

Hab. In locis sylvaticis, apud flumen "Brisbane," ad oram orientalem Novæ Hollandiæ. *D. A. Cunningham et D. C. Fraser.*

Arbor 30-pedalis, valde ramosa, ramis gracilibus, flexuosis. *Folia,* ut videtur, sempervirentia, lanceolata, integerrima, glabra, subcoriacea, atro-viridia, costata, enervia, basi in petiolum subbiuncialem attenuata, apice longe tenuiterque acuminata. *Flores* masculi non vidi. *Fœminei* flores pedunculos laterales graciles, patentes, simplices terminantes. *Perianthium* subhemisphæricum, integrum. *Stamina* nulla. *Pistillum* subcyathiforme, ore contracto elevato, intus tuberculato-farinosum, extus obsolete striatum. *Styli* obsoleti. *Fructus* germini similis sed major, ore magis aperto; e carpellis numerosis tenuibus membranaceis, circa axin centralem arctissime dispositis. *Semina* quoque loculo plerumque solitaria, reniformia, minute tuberculata.

Gladly would I, in describing this curious plant, have adopted the very expressive name given by its meritorious discoverers, were it not that it unquestionably belongs to the genus *Gyrostemon* of Desfontaines, who has, first in 1820, published one species (*G. ramulosum*) in the Mémoires du Muséum d'Histoire Naturelle, v. 6; and again a second species (*G. cotinifolium*) in the 8th vol. of the same work. Both are remarkably different from our present species. The first was detected during Capt. Baudin's Expedition, on the "Isles Steriles," the second during Capt. Freycinet's Voyage, at the "Baie des Chiens-marins," by Gaudichaud. In the last memoir on the subject, M. Desfontaines seems disposed to arrange the plant with the *Malvaceæ,* though he is aware of its affinity with the genus *Hura,* (in *Euphorbiaceæ,*) in what concerns the general structure of the capsule. In the plate given of the genus in the Dict. des Sciences Naturelles, it is confidently referred to the *Euphorbiaceæ.* I am most disposed to concur with the opinion of those who have gathered the present species, in considering it allied to the *Urticeæ.* I regret that I have not the ripe seeds, nor the male flowers, nor young female ones. My character, therefore, under the genus, of the *Embryo* and *Albumen,* is copied from that of M.

observed many beautiful *Orchideous* plants, amongst them *Caladenia carnea* and *alba.*

The view from south-east to north-west was extensive and very grand, presenting an immense, thinly wooded plain, whose surface was gently undulated, and clothed with luxuriant grass.

Flinders' Peak is seen to the westward, surrounded with numerous smaller ones. To the south and eastward arise a distant range of mountains, (since named *Mount Lindsay,*) with very lofty peaks, one of which, (ascertained to be *Mount Hooker,*) resembling a pigeon-house in form, is supposed to belong to the lateral branches of Mount Warning Ranges. To the south-west of this Peak appears the Dividing Range, with the gap, or pass, observed by Mr. Cunningham, in 1827, near Gen. Darling's Downs, under which we remarked some extensive flats, perfectly clear of wood. In the centre of the plain rises a remarkable and detached table hill.

To the north, the eye extends over a tract of lofty and forest-covered hills, interspersed with extensive districts of *Araucaria,* (the *Moreton Bay Pine,*) of which the sombre green colour forms a striking contrast to the brownish hue of the *Gum Trees,* (*Eucalypti.*)

The view easterly is most commanding. It embraces Moreton Island and Bay, Stradbroke Island, the Glass Houses, with the meanderings of the Brisbane River, and the settlements about the town. Immediately at the foot of the range, the Oxley, or Canoe Creek, is seen winding through a tract of fine country.

July 7th.—Sunday.

July 8th.—Confined by sickness.

July 9th.—Recovering; but unable to make any exertion.

Desfontaines. Whilst dissecting the flowers and fruit, they were found to diffuse a most powerful smell, resembling that of Ether.

Tab. LIII. *Fig.* 1, Branch with female flowers and fruit:—*nat. size.* *Fig.* 2, Vertical section of a fruit. *Fig.* 3, One of the capsules cut open vertically, with one perfect and one abortive seed. *Fig.* 4, Seed:—*more or less magnified.*—*W. J. H.*

July 10th.—Convalescent. In the morning I investigated the banks of the Brisbane near the town, and found some plants of a superb and unpublished species of *Bignonia:* also a species of *Limonia,* and one of *Ipomœa,* whose immense tubers are here called *Native Yams,* and are eaten by the natives.

July 11th.—Proceeded with Captain Logan and Mr. Cunningham up the Brisbane River to the Limestone Station, on the banks of the Bremer, which we reached at sunset, after having rowed for eleven hours. The south side of the Brisbane, as far as Canoe Creek, is covered with forests of *Pine* or *Araucaria,* to a considerable extent. The north bank, as far as Glenmoriston's Range, is principally open forest, not reaching far, beyond which it is clothed with pine brushes, as on the south. These forests contain immense quantities of *Yellow Wood,* (*Oxleya xanthoxyla,**) and *Tulip Wood,* with

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* OXLEYA XANTHOXYLA.

Nat. Ord. Meliaceæ. Trib. Cedreleæ. *Br.*

Gen. Char. *Flores* ignoti. *Capsula* 5-locularis in valvis quinque usque ad basin separabilis, dissepimentis e marginibus introflexis valvarum, receptaculo longitudinali demum libero, utrinque trispermo. *Semina* medio affixa, undique alata.

O. xanthoxyla. *Cunningham, MSS.*

Hab. Ad ripas fluminis "Brisbane," ora orientali Novæ Hollandiæ. *D. A. Cunningham et D. C. Fraser.*

Arbor non raro 100-pedalis, diametro ad basin trunci 3–4 pedalis, valde ramosa. *Folia* impari-pinnata, nunc ternata, plerumque 4–5 juga; foliolis remotis, oppositis, lanceolatis, brevissime petiolulatis, integerrimis, acuminatis, obtusiusculis, parallelim venosis, subcoriaceis, utrinque minute punctatis. *Flores* hucusque ignoti. *Capsulæ* maturæ 3-4 uncias longæ, oblongo-cylindraceæ, echinato-tuberculatæ, quinqueloculares, quinque-valves, dissepimentis e valvarum marginibus introflexis, valvis ad basin usque solutis. *Valvæ* singulæ divisæ receptaculis 5, ex axi centrali progredientibus, planis, dorso incrassatis, demum liberis, utrinque trispermis. *Semina* ad marginem interiorem receptaculi medio affixa, complanata, undique, sed utraque extremitate præcipue, membrana alata cincta. *Albumen* nullum. *Embryo* e cotyledonibus duabus transversis, planiusculis, albis, carnosis, glanduloso-punctatis. *Radicula* ad hilum seminis versa, epunctata. *Plumula* compressa, punctata.

Such is the description I have drawn up from the fruit and foliage of this newly discovered plant, which, being nearly allied to *Flindersia* of the learned

Figs of five or six different species, *Grevillea venusta, Br.* (the *Silk Oak* of the pine cutters,) and a great profusion of magnificent trees.

Beyond Canoe Creek, the *Pine* partially disappears from both sides of the river, and its geographical situation is occupied by enormous *Figs.*

Two miles beyond Canoe Creek is an excellent quarry of freestone, which is conveyed by water to Brisbane Town, a distance of eleven miles. Its quality is excellent, being granular, and when first cut quite soft, but exposure to the air renders it as hard as granite. Following the course of the river towards the termination of Oxley's Range, the banks, which are comparatively divested of thickets, become more open and picturesque, and the nearer the Bremer is approached, the clearer is the country and the more precipitous the banks. These are interspersed with excellent *Gum Trees,* (*Eucalypti,*) and occasional patches of *Currijong,* or *Natives' Cordage Tree,* (*Hibiscus heterophyllus,*) which again are overhung with a new and beautiful kind of *Passion Flower,** (*Passiflora,*) whose blossom is greenish yellow, while

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Brown, Mr. Cunningham has wished should bear the name of another able officer, whose valuable surveys have materially tended to a more correct knowledge of the vast territory of New Holland. It is to be regretted that we are as yet ignorant of the flowers of this plant; but it may be expected that they will bear a great resemblance to those of *Flindersia,* for in the fruit there is a considerable affinity. In *Flindersia,* however, the capsule does not separate, as here, to the very base, into 5 valves: the receptacles of the seed have only 2 seeds on each side; and the seed is erect and winged only at one extremity. The remarkable yellow colour of the wood has suggested the specific name. Its timber is found to be very useful in various kinds of carpentry, and in the building of boats, &c.

Tab. LIV. *Fig.* 1, Branch with leaves and a ripe capsule in the act of bursting, each valve carrying with it its own central portion of the receptacle to which the seeds are attached. *Fig.* 2, One of the lobes or plates of the receptacle taken out from the valve. *Fig.* 3, Embryo. *Fig.* 4, The same with the cotyledons laid open to show the plumule:—*all but figs.* 3 *and* 4 *of the nat. size.*—*W. J. H.*

* *P. Herbertiana,* Bot. Reg. t. 737, where it is mentioned as a discovery of Mr. Cunningham in the interior of New South Wales. It belongs to the genus *Disemma,* of Labillardière and De Candolle.

the oval fruit, of which I partook, is produced in great quantities, and affords a grateful flavour.

On reaching the confluence of the Bremer, the change in the character of the country is very apparent. On each side it is of the richest description, thinly wooded, and with abundance of water. The left bank is formed of flats gently sloping towards the Bremer, as well as towards a stream called Six Mile Creek, which takes its source in the mountains of Flinders' Peak. These flats are of the richest black loam, and covered with an extraordinary species of *Angophora*, and an unpublished kind of *Xanthorrhœa*, which attains the height of twenty feet, averaging not more than fifteen trees to an acre. Over this tract we proceeded until we came to the limestone formation at the navigable source of the Bremer, a spot that will at no distant period be the principal key to the internal commerce of this interesting portion of Australia.

The River Bremer, at its confluence with the Brisbane, may be estimated at forty yards wide, an extent which it carries to within a mile of the limestone station. It is navigable for seventeen miles above its junction with the Brisbane, for vessels drawing six feet water; and as far as the limestone, which is fifteen miles, for small sloops or schooners. Numerous beds of coal, lying in veins of considerable thickness, are adjacent to the lime: they jut out from the banks of the streams, and fall into the Bremer within a few yards of its tide mark. The limestone is singularly disposed, in large masses, intermingled with nodules of silex and chalk: on the surface it presents ridges of detached portions, several of which are covered with hexahedral crystals, and in many instances it is observed to form a remarkable conglomerate with quartz and silex, while great quantities of chalcedony and carnelian, broken into small fragments, lie scattered on the surface.

The summits of the lime ridges are studded with various species of *Ficus*, and many individuals of a genus belonging to the *Meliaceæ*. From Brisbane Town to the Limestone Station, is estimated at 24 miles by land, and 50 miles by water.

July 12th.—At daybreak I started for Flinders' Peak, distant about ten miles. The first three miles lay over a beautiful country, when the soil changed to a light red sand, and the ascent of the lateral branches of the Peak commenced. For the first two miles the rise is very gentle, afterwards it becomes much more abrupt, and with this change in the geology ensues a consequent alteration in the soil and its productions. Having climbed a very high range, we obtained a magnificent view of the Peak, with its terrific northern front of perpendicular rock. The southern side appeared to be more accessible, being clothed with thick brushwood to the very summit.

From the situation which we had now attained, we clearly saw the impossibility of reaching the top by sunset, and having made no preparations for remaining an additional day on the journey, we determined upon descending into the valley to bivouac for the night, some of the party endeavouring in the mean time to penetrate as far as its base by a valley which promised to be practicable, but which proved quite otherwise. At sunset we halted on the edge of a lagoon, and formed a hut of grass to sleep in, the whole party being completely exhausted through fatigue.

July 13th.—The morning was excessively cold. At break of day we retraced our way to the Limestone Station, where we arrived at ten o'clock. The rest of the day was devoted to the examination of the neighbouring district, and the coal seams, which are abundant. The view from the Limestone Hills is extensive, and the exact bearings were ascertained of the centre of the Pass in the Dividing Range, Flinders' Peak, Sir Herbert Taylor's Range, and Mount Forbes. The country between the Limestone Station and Brisbane Town, seems low and open.

July 14th.—At eight o'clock, embarked for Brisbane Town, and reached it at half-past nine in the evening.

July 15th.—Went to examine the lower part of Breakfast Creek, and discovered a gigantic species of *Aspidium*, bearing fructification only on the terminal pinnæ. It is a native of salt marshes, and generally grows from 5 to 6 feet high.

On the edge of the brushwood I found a *Croton*, with a remarkably ciliated calyx, and a kind of *Ficus* with digitated leaves. While following the line of the creek, I met with the females of a tribe of aborigines, who, on seeing me, set up a dreadful yell. Their cries brought the men, who, observing however that I was not a runaway convict, offered me no violence. At three o'clock, I returned to Brisbane Town.

July 16th and 17th.—These days were devoted to procuring living plants in the vicinity of the town.

July 18th.—Proceeded, in company with Capt. Logan and Mr. Cunningham, to Stradbroke Island, and reached Dunwich at one o'clock in the afternoon. Immediately on landing, we ascended the hills to the east of the settlement, and found them covered with *Callitris, Casuarina, Banksia Compar*, and *B. æmula*, and the soil consisting of white sand. Among the new plants were a species of *Boronia*, one of *Zieria, Callitris, Casuarina*, and *Persoonia*. The soil on the lower part of Stradbroke Island is a red loam, containing much sand, but by care it might be made to produce good crops. The rock is a bright red sandstone or ironstone.

From the establishment at Dunwich, there is an extensive view of Moreton Bay, the Glass Houses, Flinders' Peak, the lateral range of Mount Warning, and Sir Herbert Taylor's Range.

July 19th.—Examined the Cotton Plantation, which I found much neglected, the stools being literally covered with weeds. All along the Plantation runs a beautiful stream, issuing from an extensive swamp, in which I found a profusion of *Melastoma Banksiana*, with a species of *Dacrydium*. On the beach were thickets of *Hibiscus tiliaceus*, and *Pandanus pedunculata*: the latter is called *Bread-fruit*, and eagerly eaten by the natives. A beautiful species of *Pinna*, or *Fan Muscle*, was abundant on the mud flats, and I succeeded in obtaining a few specimens.

July 20th.—Returned to Brisbane Town.

July 22d.—Employed in procuring plants on the river banks till eight o'clock, when I found the party proceeding to Mount Warning, on the south bank, consisting of Capt.

Logan, Mr. Cunningham, one soldier, and five convicts, with their bullocks; but on arranging our provisions and luggage, we found that three beasts were inadequate to carry it all, and were therefore obliged to delay our departure till the following day, in order to procure another. At noon I returned to Brisbane, and assisted in laying out the walks of the New Garden.

July 23d.—At eight o'clock we started, but had not proceeded above a mile, when we discovered that one of our bullocks could hardly stand under his load, while another had reared so as to break a part of his harness. To relieve the first, we reduced our stock of flour by 112 lbs. which we sent back, and the necessity of getting the harness of the other animal repaired caused us to encamp for the day.

July 24th.—At seven o'clock, we set off towards Couper's Plains, passing over a tract of indifferent land, composed principally of clumps of *Iron Bark Trees, Eucalypti,* and small vallies, abundantly watered. By eleven o'clock we had accomplished nearly six miles, and then halted till one, to rest our cattle, at the edge of the plain, or, more properly speaking, of the *Flats,* on the banks of a beautiful chain of ponds. Thence we continued our way across these flats, which are composed of excellent land, thinly wooded; and it appears evident to me, that the water must often stand here in many spots, on account of the numerous hollows in the surface. This district probably contains 5000 or 6000 acres. The timber is decidedly of little worth, but the ridges produce abundantly the *Iron Bark* and *Blue Gum Trees,* (*Eucalyptus piperita.*)

We encamped at three and a half miles from the entrance of the flats, on the west bank of Canoe Creek, by which they are bounded, having accomplished a distance by the adometer of nine miles.

There was nothing novel in the botany of this district. The principal timber consisted of *Banksia Compar, Tristania robusta, Iron Bark,* some stunted *Casuarinæ,* and a species of *Acacia* with long cylindrical spikes of flower.

July 25th.—The temperature delightful, and sky cloudy. At half-past eight we continued our course southward, which led us for a considerable distance along the banks of Canoe Creek, over a country varied with alternate strips of *Tea Tree*, (*Melaleuca linariifolia*,) of swamps and sandy forest land, the latter consisting of *Honeysuckle Tree*, (*Banksia integrifolia*,) the *Forest Oak*, (*Casuarina torulosa*,) and stunted *Gum Trees*, (*Eucalypti*.) The creek now taking a sudden eastward turn, we were obliged to ascend a range of low hills, leaving on the left some beautiful flats of rich land. The hills are formed of a light sandy soil, and clothed with a sward of good grass, and I remarked several encampments of natives, the shape of whose huts were different from any I had hitherto seen. At half-past seven we again fell in with the course of the creek, and rested our cattle. Having carried their loads across the creek, and reloaded, with some difficulty, the animals, we resumed our journey at one o'clock. The way lay over a tract of uninteresting country, interspersed again with swamps, clumps of *Tea Tree*, and flats of a poor argillaceous soil, which, however, produced some excellent timber. We again left the creek, and crossed several ridges of *Honeysuckle Tree* and *Forest Oak*, the latter overgrown with a magnificent species of *Loranthus*. At two and a half miles from the creek, we passed a grave of a high oval form, around which lay felled about forty large trees of *Banksia Compar*: they had evidently been cut down with a hatchet, and their tops were carefully laid over the grave, as if on purpose to conceal it. The most probable conclusion from this circumstance was, that the interment belonged to one of the runaway convicts from Brisbane Town. Beside the grave was a large hole, full of water, and a well-beaten path led to it. Beyond this spot an evident alteration was observable in the country. The *Honeysuckles*, (*Banksia integrifolia*,) disappear, and are succeeded by an open forest of sandy soil, after passing nearly two miles of which, we encamped for the night, on the margin of a small creek, having accomplished by the adometer, a distance of ten miles, and the reduced true course south being nearly nine miles.

July 26th.—The morning clear and piercingly cold, so that we found two blankets and a counterpane insufficient for our shelter. At eight o'clock we started, travelling agreeably over an extent of open and gently undulating forest ground, and after four miles and a half reached the River Logan, at its junction with a creek. At this spot it is a fine rapidly running stream of considerable magnitude, and in ordinary seasons must contain a large body of water: the immediate banks are bold and almost precipitous, clothed with thick brushes of creeping plants, containing a great number of the *Castanospermum*, or native *Chestnut Trees.* Having unloaded the bullocks, we got them across with some difficulty, and carried their burdens to the opposite shore. The country for some distance from the Logan River, is very rich, and produces fine *Gum Trees.* At noon we observed the latitude, which showed 27° 48′ South. An hour after, we pursued our way through fine forests, and once more arrived at the Logan, at the distance of but a mile and a half from our former crossing place. We found it impossible to ford the river again, and were obliged to hold on for two miles in a more easterly direction, until the windings of the stream should again permit us to proceed southward. Having passed two creeks which fall into the Logan, and reached a much improved country, we halted for the rest of the day: our progress was eight miles and a half, and the true reduced course to the south six miles. We had observed nothing new in the botanical features of this day's journey.

On the banks of the Logan, and in the immediate vicinity of a native encampment, I noticed three sticks set upright in the ground, forming a triangle, and fastened together by a cord at top, on which was placed a sheet of bark; and seeing something suspended under shelter of this bark, my curiosity induced me to point it out to Capt. Logan, who informed me that it is customary for the tribes, when leaving a district, to deposit in such a situation their *Kangaroo-Nets, Dillies, Bass mats,* chissels, and superfluous implements, until their return. It is considered the greatest breach of faith among

these rude nations to touch any of the articles thus placed; a degree of honesty which, it is to be feared, we might look for in vain among their white neighbours. On examining this depôt, we found a *Kangaroo-Net,* 50 feet long and 5½ feet wide, formed of the most excellent twine, as fine as any fabricated in Europe, but much stronger, and woven in a manner that would do credit to a professed net maker;—a fishing-net of a beautifully fine mesh, and dyed black, forming, when in the water, an inverted cone about 7 feet deep;—a *Dilly,* or luggage-bag, such as the females carry, made of the leaves of a species of *Xanthorrhœa,* and strong enough to bear any weight;—two *Eillmans,* or shields, of the wood of *Urtica Gigas,* or the *Tree Nettle,* as light as cork; two chissels edged with flint; and an iron wedge, evidently stolen from Brisbane Town.

July 27th.—The morning proved clear and pleasant; thermometer indicating 47°. We set off at the usual time, and travelled over a good and level country, of which some parts are swampy, and others varied by hills of small elevation, and covered with forests of *Casuarina, Jacksonia* or *Dogwood,* and fine *Gum Trees.* At two miles and a half from our encampment we crossed a large creek, whose swampy banks harboured many kangaroos. From this point we were again compelled to deviate in a westerly direction, having, at the distance of another mile, crossed a second creek which falls into the Logan, and whose banks are remarkably fertile, and, half a mile farther on, a third creek, of which the sides are clothed with such dense forests of *Araucaria,* and *Yellow Wood,* that we found it impracticable to force the cattle through, so that we were obliged to ascend the hills where this stream takes its source. At noon the latitude proved to be 27° 52″ South. Here we observed one of those remarkable battle circles, which seem peculiar to the natives of this part of New Holland. It consisted of an enclosure 33 yards in circumference, edged by a path 3 feet broad and 10 inches deep, from which another path of similar dimensions diverges in a direct line, frequently for half a mile in length. The history of the circumstance

which led to the formation of these circles was narrated to me by an eye-witness, who had lived for nineteen months among these tribes; and his testimony is strongly supported by facts that have been recently elicited during the formation of the settlement at Brisbane Town.

It was discovered, by one of the tribes inhabiting the banks of Pumice-Stone River, that a neighbouring tribe had trespassed on their hunting and fishing stations, whereupon a warrior was sent to the aggressors, who resided at three days' journey north, to demand satisfaction by battle. The challenge being accepted by the latter, they marched to meet their enemies in a body amounting to about 250 souls, including women and children, and when they had reached the territories of the aggrieved chieftain, they sent to request permission to cross his boundary-line. The chief was absent on a kangarooing expedition, but he immediately granted leave when he returned. The party, on passing the boundary-line upon the beach, made each a mark across with their toes, the meaning of which is not yet known; they then approached the scene of action, and encamped for the night. In the morning all the warriors were in readiness, and advanced to meet the enemy, followed at no great distance by the women and children, whom they gave in special charge to my informant, the Europæan Finnigan, with strict orders that he should not quit them. Curiosity, however, urged him to approach the field of battle, when he states that the picked men on both sides, being armed, entered the pathway and marched into the circle. Here two were selected from each party to fight with spears and eillmans, and the contest lasted a long time, until both the men from the aggressors' party fell, covered with wounds, on which a number of their friends rushed into the circle and carried the bodies away. Immediately on this an appalling cry was raised by the tribe which had originally been injured; they fell on the enemy with the utmost fury, and chased them for a considerable distance, keeping up a running fight, till night put an end to the combat.

The vanquished tribe immediately forsook their former

encampment, and, carrying the dead bodies with them, removed to a spot two miles distant to the north, where they kept up the most horrible lamentations. Having encamped, they immediately commenced their operations by flaying and burying the bodies: they then carried the skins away to a considerable distance, where they formed a triangle of spears, around which they twisted the skins, leaving the face, palms of the hands, and soles of the feet suspended. A fire was then kindled beneath them, till the skins were dried to the consistency of leather, when one of the warriors took them down, and after performing some ceremony over them, carried them away, the whole tribe uttering a dreadful yell, and nothing farther was seen or heard of them.

Mr. Cunningham has in his possession the skin of one of the female aborigines, which was procured by Private Platt of the 57th Regiment, from the hut of a native on the banks of the Brisbane River, just above its junction with the Bremer. It consists of only the front of the body, arms, and legs; the fingers and toes have their nails perfect, but the face is wanting, although the ears remain. It had been deposited in the *Dilly* or luggage-bag of a female, and carefully placed within one of their nets.

At one o'clock we continued to ascend the range, by which we were enabled to keep on our course; the rise was gradual, so that the cattle got up without difficulty, and the defiles on each side are clothed with *Pine* forests to the very summit, over which is the only practicable pass, and along which we found travelling very good. Our bullocks being extremely fatigued, we encamped at the northern extremity of the range: our progress was estimated by the odometer at nearly nine miles, its reduced true southerly course at five and a half miles. On the summit of the range we observed a rock of remarkably compact granular silex, which, on examining, we found to have been lately split by the natives, for the purpose of fabricating tomahawks and chissels; but by what means they contrived to break this rock yet remains a secret. An extensive view is obtained from this eminence, stretching to north and south-east, where the whole of the

valley of the Brisbane and the shores of Moreton Bay appear to great advantage; while to the east may be seen the valley through which the first branch of the Logan passes, in the direction of Mount Warning. We found on this range of hills a beautiful new species of *Acacia*, (*A. podalyriifolia*,) with glabrous leaves, and *Hovea acutifolia.*

July 28th.—Morning clear, and thermometer at 50°. At eight o'clock, we began to descend this range, which was named Birnam, and skirted its base through a tract of very fine forest land, where the *Iron Bark* and *Apple Trees* (*Angophora lanceolata*,) abound. Here the character of the scenery changes, the hills and vallies assuming the richest verdure upon a soil of dark brown loam. Still descending, we traversed wide flats of prodigious fertility, which seem to extend to the Logan, whose course is here in a southerly direction. A magnificent valley now opens to the view, stretching southward almost as far as the eye can reach, and named the Vale of Aris, terminating by lofty peaked mountains, supposed to be Mount Warning and the Lindsay Range. From this point, Flinders' Peak bore west by north half west, distant about fifteen miles, and the intervening country appeared low, fertile, and of easy access.

Descending into the valley, we crossed a lovely open plain of the richest verdure: its length we estimated at about two miles, and breadth one mile and a half. On the north and east it is skirted by beautiful open forest hills; on the west by the river Logan; and on the south by a considerable extent of low richly wooded ground, and is named Letitia Plain. From this situation we had a grand view of Flinders' Peak. A mile farther on we arrived at a beautiful lagoon, where we found a new species of *Villarsia*, to which, on account of its orbicular leaves, we gave the appellation of *nymphæœfolia.* Here we took the latitude, 27° 56″ South.

An eastward turn of the River Logan, at two and a half miles distance from the lagoon, intercepted our progress. It was joined by a creek, passing from Birnam Range, and the banks are so thickly clothed with brushes of *Araucaria*, that we found it quite impracticable to effect a passage for the

cattle. We were consequently obliged to cross the River Logan, which we accomplished with difficulty, not because of the quantity of water, though the stream is wide, but on account of the dense thickets that fringe its almost perpendicular banks. The west bank seems to rival the east in the richness and extent of its flats, while, from the hilly nature of the former, *Grevillea venusta* shows to the greatest advantage. At half-past three we encamped, having completed, as we ascertained by the odometer, a distance of only nine miles, and but five miles directly to south-west.

July 29*th.*—Weather exceedingly wet, with heavy squalls from the west: at noon it cleared up a little, which enabled us to ascertain the latitude, 27° 58′ 03″ South.

July 30*th.*—The morning fine and clear, with wind from the south-west. We started at the customary hour, and travelled over one of the finest tracts of country I ever beheld, stretching as far as we could see on both sides of the river, and towards Flinders' Peak. Three miles from our encampment we traversed a small plain, from which Flinders' Peak bore W. N. W., distant about fifteen miles. One mile farther south, a low ridge approached the river, from which we obtained a magnificent view of the middle district of the vale, as it may be termed. This range, and one immediately opposite, dividing it distinctly at the extremity of the valley, appear to be a magnificent chain of mountains, whose lofty summits are capped with clouds; Mount Warning, Mounts Hooker, Clanmorris, and Lindsay, are among the most elevated of the peaks. On descending this lower part, (named Dunsinane,) we crossed a creek of considerable width, flowing from the north-west through an extensive valley, and then continued our way in the vale, the flats increasing in magnitude, and, if possible, improving in soil. The hills by which these plains are bordered, are of gentle ascent, and clothed with a lovely verdure: they seem eminently adapted for sheep grazing. At three o'clock we halted for the rest of the day, immediately on the bank of the river, having accomplished ten miles direct south.

Close to our encampment we observed a number of fires,

kindled by the natives, with quantities of *Chestnuts* (*Castanospermum,*) and native *Tarra,* (*Caladium glycyrrhizon,*) in the process of roasting, and a considerable portion not yet prepared. A semicircle of stones is formed round each of these fires, over which two-thirds of the fire-wood is allowed to project, evidently for the purpose of cooking the fruit in the hot ashes. On seeing us approach, the people fled. I observed much variety in the construction of their huts, all of which were covered with grass. On a small detached conical hill, close to our encampment, the natives remained, apparently watching us. At four o'clock, we ascended this hill, which we found to be of basaltic formation; many of the columns measured seven feet of external length, their prisms perfect, both hexahedral and tetrahedral, with confused masses lying between them. Among these I found *Polypodium diversifolium, Br.*

In our descent, we surprised a native lying concealed under a log of wood, in the apparent hope of finding an opportunity to secure the provisions and implements which they had left behind in their encampment. He was dreadfully alarmed, and as soon as he got clear of us, precipitated himself into the river. Latitude 28° 06′ 19″ South, being exactly in the parallel of Point Danger, and Mount Warning, and Mount Dumaresq, on the borders of the Darling Downs. Evening exceedingly cold, with stormy breezes and showers from the south-west.

July 31*st.*—The cold was piercing this morning as we pursued our journey up the valley. I went, accompanied by Capt. Logan, to the summit of a lofty hill (Mount Edgar) immediately west of our last encampment, from which the view was particularly grand; the supposed Range of Mount Warning, (the correctness of whose situation we now began to doubt,) showed to great advantage, as did many of the peaks in the Dividing Range. In the north and north-east appeared the vale of the Brisbane and Sir Herbert Taylor's Range, the low hills in the immediate vicinity of Brisbane Town, and the low ranges on the shores of Moreton Bay, and Birnam Hill with its pine-clad summit, which, from its

situation at the entrance of the vale of Aris, bears some resemblance to the original hill of that name at the opening of the vale of Athol. To the east lay the upper ward, if I may so call it, of the vale, which seems of much greater extent than any of the others; in its centre is a plain of considerable magnitude, (Innes Plain,) through a part of which the Logan meanders, this tract not being less than ten miles across from east to west. From the sudden turn which the river took, we were enabled to cut off a considerable angle, by which we were led through a district of the richest sheep country I ever beheld. At ten miles from our last halt, we passed over a small plain covered with *Emus*, whence the view of the western cone of the supposed Mount Warning, (Mount Clanmorris,) rising 5000 feet above the level of the sea, was peculiarly imposing. At half-past three we paused for the remainder of the day, our progress being eleven miles and a half—ten miles and a half due south.

Aug. 1st.—Morning cold and frosty; thermometer at 35°. At a mile and a half from our encampment we crossed the Logan, having mistaken it for a stream descending from Mount Clanmorris, and holding a south-west course, by which our progress was shortly after arrested. The latter river, the Lyon, sweeps through a most beautiful valley, and seems to have its source at the foot of the eastern cone (Mount Hooker) of the high Range. We followed it upwards for two miles and a half, till the dense forests of *Araucaria* forbade our farther progress. We named this romantic valley Glen Lyon. Having regained, at one o'clock, our former track along the Logan, we proceeded for two miles and a half along its banks, through a fine flat country, above which the high central peak (Mount Lindsay) rose in great majesty, so that the *tout ensemble* of the whole upper ward of the Vale of Aris may compare with any scenery that I ever saw. Our walk this day was short, but eight miles, and its true southward progress only two miles and a half.

The banks of the river abound here with wild turkeys, and are thickly overgrown with forests of *Cedar*, (*Cedrela Toona*,) and *Chestnuts*, (*Castanospermum*,) which, with the

roots of *Caladium glycyrrhizon* afford the chief aliment of the aborigines. The *Chestnut Trees* are of rapid growth, and yield a most grateful shade.

Aug. 2*d.*—A hoar frost added to the chilliness of the morning, and the quicksilver, at eight o'clock, stood at 40°. Two miles from our encampment, the Logan receives a rivulet from the north, and suddenly alters its westerly to a southward course. One mile farther, on the accession of the Benvie stream, it changes back again to the westward, and, sweeping round the base of Mount Clanmorris, passes through a magnificent valley, which, to save distance, we left on our right, the mountain bearing from us west by north. Through hilly forests, we entered a valley of the richest and most varied character, from which Mount Lindsay rises with a grandeur that baffles all description. Downwards from its summit, which is about 5500 feet above the valley, it presents a perpendicular front of rock at least 2000 feet high, and the whole springs, as it were, from a base-line of fine flat land, stretching for more than five miles, uninterruptedly, between Mount Clanmorris and M'Pherson's Range.

We halted on the banks of the Logan at two o'clock, having accomplished eight miles to-day. An hour after, the Captain and I ascended a circular range of hills which seemed to gird the base of the mountain, in the hope of finding a path by which it might be possible to climb it. This range is composed of argillaceous trap, and I discovered on its summit a new species of *Acacia*, with uniform leaves. We regained our tent in the afternoon, having met with a tribe of natives in the way, who, as usual, took to their heels on our approach.

Aug. 3*d.*—Morning cold and frosty. At day-break, Capt. Logan, Mr. Cunningham, two men, and I began the ascent of the mountain. On attaining the summit of the ridge, over the lower part of which, as I mentioned, we had passed yesterday, we found that it conducted to the centre of the mountain's northern front, at an elevation, assuredly, of 2000 feet from the Logan, which flows at its base. Here that front presents a really terrific aprearance, being a perpendicular

mass of rock, unvaried by even the smallest trace of vegetation, except a few straggling lichens may be so called. From the above-mentioned ridge, we scrambled, with considerable difficulty and some risk, over masses of detached rock, lightly studded with trees and shrubs, by which our progress was much aided for about 1000 feet farther, till we reached the summit of one of the defiles, where, for a while, all farther advance seemed to be forbidden. Hence we saw Mount Warning bearing east by south, and about twenty-five miles distant.

On a careful scrutiny of the fearful precipices which overhung us, Capt. Logan detected a path by which it appeared possible, and barely possible, to ascend; so, putting off our shoes and stockings, and leaving the rest of the party behind, he and I began scrambling on hands and knees to the first peak, a height of about 300 feet, with great difficulty, but having once attained a certain elevation, we had no alternative but to proceed, any attempt at returning in this direction appearing totally impracticable. To cast a glance downwards was most perilous, for a dreadful chasm, 1600 feet deep, yawned below us; while to the right extended a trackless labyrinth of detached rocks: to look forward was enough to quell the firmest courage, by displaying the dangers and difficulties that beset our path; so that all we could do was, by clinging fast with our great toes, to trust ourselves to small nodules on the surface of the crags, and thus to effect an advance by suspending our weight on slender twigs of *Casuarina* and *Metrosideros*, whose appearance scarcely warranted them strong enough to support a goat. When the summit of this peak was gained, my nerves were so much agitated that I was forced to lie down on a rock, resting myself against a bush till I recovered.

Capt. Logan now proceeded towards the next peak, and, as soon as I possibly could, I followed him, leaving my shoes and collecting-bags behind. From the size of the detached portions of rock, and the stunted nature of the shrubs of *Casuarina*, *Eucalyptus*, and *Banksia*, which start up here and there between the fissures, our progress was both difficult and dangerous; and finding it hopeless to climb far on

such ground without shoes, I returned for them, and was thus thrown considerably in the rear. I hallooed continually to Capt. Logan, who always answered me while within hearing, but the number of echoes, at least five, which repeated backwards and forwards the different sounds, had such an effect in confusing me, that I knew not whence the voice came; and it would have required the speed and agility of an antelope to overtake him. I continued scrambling onwards till half-past eleven, when I perceived Capt. Logan near the summit, and then relinquished all hope of joining him; I also struck into a brushwood of *Eucalyptus mimosoides, Tasmannia insipida, Xanthorrhœa hastilis, Epacris grandiflora,* and several Port-Jackson *Ferns,* among which I observed *Gleichenia angustifolia.*

From the dampness of the earth, I hoped to obtain here some water wherewith to allay my parching thirst, but I was disappointed. Through this brush I at length penetrated, and advanced about 500 feet higher still, when my strength became so much exhausted, and the day so far advanced, that after waiting an hour in expectation of seeing Capt. Logan, I commenced my descent, the summit of the mountain rearing its gigantic head full 800 feet above me.

The descent proved a more difficult task than the climbing had been, from the narrowness of the ridges, in many places not exceeding six feet, with huge precipices on each side, and the danger of slipping between these masses when leaping from one to another, many of them being as slippery as a piece of ice, in which case an instantaneous death must have been my portion. After prodigious exertions, I succeeded in regaining the point where I had left my collecting-bags and shoes, and now I was still more puzzled how to descend thus encumbered; but, mustering all my courage and caution, I began sliding gently from bush to bush, often narrowly escaping being dashed to atoms, and by carefully lowering my boxes and shoes before me from one point to another, I at length got within sight of Mr. Cunningham and the rest of the party, by whose assistance I was lowered down the rocks, having almost all my clothes torn off my back.

During our journey towards this mountain, we had conceived it to be Mount Warning, allowing some considerable error to have occurred in laying down the geographical position of the latter, and not seeing any high land to the eastward of it; but having ascertained its true situation to-day, we named it Mount Lindsay, in honour of Col. Lindsay of the 39th Regt. The view from this mountain is peculiarly grand: northward lies the vale of the Brisbane River, bounded in that direction by distant chains of lofty mountains, the outlines of whose peaks we could scarcely discriminate. To the north-west, the Dividing Range of the Interior Waters, with its lateral hills projecting into the plain, appear to great advantage, as well as Mount French, and the lovely plains in its immediate vicinity. To the north-east is Flinders' Peak, with Moreton Bay and Island, and the Glass Houses, bearing north-east, half east. Eastward rises Mount Warning, distant about twenty-five miles, (with its lateral ranges,) appearing at least 3000 feet lower than Mount Lindsay, and in the same direction lie several extensive tracts of perfectly open country. A magnificent district extends to the southward, exhibiting many wide and partially cleared plains, stretching as far as the eye can behold. To the west, the ground is high and rugged. I could perceive, south of me, the meandering of a stream, (the Richmond River, so called by the Hon. Capt. Rous,) which Capt. Logan surveyed from his loftier position, without any obstruction, and reports it to be a river of considerable magnitude. Mount Hooker, with its pigeon-house shaped summit, forms a striking feature in the landscape to the south-east, while Mount Clanmorris and Lloyd's Hills, on the north-west, add greatly to the interest of the country in the opposite direction.

On the north-west shoulder of Mount Lindsay, there is an extraordinary projecting precipitous rock, which was named Blantyre Head.

At four o'clock we were joined by Capt. Logan, who had encountered much risk and difficulty, and we regained our encampment, passing through the forest land, at six o'clock.

The botany is not much varied, the only novelties being a species of *Kennedia*, with one of *Calythrix*, *Callicoma*, and *Elichrysum*. It is worthy of remark, that on the upper regions of these mountains, the common productions of the South-head Road and Port Jackson predominate.

Aug. 4th.—Weather cold and bleak. At eight o'clock, Capt. Logan proceeded to the base of Mount Hooker, for the purpose of examining the Pass, (since called St. George's,) which we observed there yesterday, when upon Mount Lindsay. He returned at six in the evening, having advanced six miles to the south through the Pass, and reports that the path is accessible, though it requires some clearing. It may be approached either by Glen Lyon, or by the base of Mount Lindsay, and it will soon be the great entrance to the Shoal Bay Country, connecting those tracts with the Moreton Bay Country, which promises to be, ere long, the emporium of Australia. We took the height of Mount Lindsay above the valley, by trigonometrical survey, which gave an elevation of 4755 feet, and allowing that the valley itself, as calculated by the barometrical experiments, was 900 feet above the level of the sea, an altitude of 5655 feet will thus belong to the mountain; while Mount Hooker may be estimated at 4000 feet, and Mount Clanmorris at 5000.

The latitude was 28° 15′ 21″ South, and allowing the centre of Mount Lindsay to be three miles south of the situation of our tent, its true position may be reckoned at 28° 18′ 21″ South, long. 152° 0′ 06″.

Aug. 5th.—The morning was clear and calm, and we started at the usual hour. Our course being altered from that of yesterday, we were led into a ravine, formed by the River Logan, between Mount Clanmorris and Lloyd's Hill, through which we found it impossible to effect a passage. Capt. Logan and Mr. Cunningham having got through on foot, I returned with the cattle by the way that we had gone on the 2d, and rejoined them on the banks of the river, which here expands into a fine stream, and in which, a few miles farther on, there is no current whatever, the whole percolating through the gravelly bottom. After crossing the river,

we again turned to the north-west, and climbed a lofty range of forest-covered land, of easy access, and where the soil and grass are excellent. At three o'clock we halted on a tract of the same forest ground, well watered: Hughes' Peak bearing from our tent north $35\frac{1}{2}^{0}$, having performed a distance of nine miles, and true north course four miles and a half.

Aug. 6th.—Morning clear and chilly. At a mile and a half from our encampment, we descended into a beautiful valley, watered by the Benvie, stretching to the south-west round the base of Mount Clanmorris, which frowns in awful majesty over the lovely vale beneath. The flats increase as we advanced, both as to breadth and fertility, and the stream winds beautifully through them. Our course lying to the north, we were obliged to quit this fertile valley, which I did with much reluctance; the magnificence of the mountain scenery, and the richness of the soil rendering this one of the most enchanting scenes in all New Holland. Again we crossed a considerable tract of high forest ground, which was of good quality, and continued for several miles. Some of the ridges seem formed of excellent lime. On attaining the northern boundary of this country, we saw a wide extent of open marshy flats, bounded by a range of picturesque hills, lying before us to the north. We named the latter Minto Craigs, and gave the appellation of the Teviot to a lovely stream which flows at their base. This tract, as well as that in the direction of Mount Lindsay, had been explored in 1827 by Capt. Logan. Hence Mount Shadforth is seen to much effect: this country is the commencement of Teviot-dale, the stream being formed by the combined waters which descend from Mount Shadforth and the Dividing Range, and it is exceedingly fertile and picturesque. Here the *Emus* followed us for a considerable distance, apparently fearless of any danger. At five o'clock, we encamped on the banks of the Teviot, having accomplished by the odometer eleven miles and a half, and the true reduced course being nine miles west, seventeen south.

Aug. 7th.—Our bullocks having strayed this morning, we were unable to start till ten o'clock. At eight o'clock, I

ascended Minto Craigs, where I found an unpublished species of *Acacia*, one of *Hovea*, *Lasiopetalum*, *Croton*, *Leptospermum*, of *Aspidium* and *Alyxia*, with the *Epidendrum proliferum*. The hills are composed of a compact silicious trap, forming large precipices. To the west is an extensive valley, containing a plain of considerable magnitude, while the Teviot meanders to the south of Flinders' Peak. On the north, I saw some large flats or plains, reaching to the base of Mount French. At the base of these Craigs, I killed an enormous brown snake, nearly eight feet long, in an almost torpid state. Our course (west by north) led us through a tract of rugged forest ranges, covered with ironstone and trap, the former in nodules, enclosing indurated clay, which rendered travelling difficult for our cattle. At twelve, we descended into the flats that I had descried from Minto Craigs, (Dalhousie Plains,) which proved exceedingly marshy. They abound in *Emus*, and enclose some of the largest ponds in the east coast of New Holland. Finding it impracticable to penetrate from this point to the Gap or Pass in the Dividing Range, seen by Mr. Cunningham in 1827, without rounding the eastern extremity of Mount French, (called Mount Dumaresq by Capt. Logan in 1827,) on account of the impervious nature of the forests of *Araucaria* with which that mountain is clothed, though we felt most anxious to obtain a view of the country west of that Range, and to satisfy the curiosity of those persons who have been interested in the surveys of 1827 and 1828; we were, nevertheless, obliged to abandon it from that point, and to pursue a more easterly course. This determination arose from no willingness on the part of any of us to relinquish the former plan, but was forced on us by the reduced state of our resources, and the exhaustion of our bullocks, although Capt. Logan used every means that could be devised for their relief. I had been a determined enemy to the employment of those animals previous to this excursion, but I am now convinced, from what Capt. Logan has effected with them, as well as from my own experience, that celerity of movement is the only point in which they are inferior to horses.

At one o'clock, we encamped on the borders of the marsh. Captain Logan and two men went to ascertain the possibility of penetrating to the Dividing Range, and returned at six o'clock with an unsatisfactory report.

Aug. 8th.—The weather was mild and clear this morning, and we pursued our way along the flats seen yesterday, which we found to stretch round the eastern base of Mount French. Their length is about seven miles, and their breadth from one and a half to two miles. Towards the north-east they are dry and well watered, and the chain of ponds that commences at their north-east extremity soon becomes united, and forms a beautiful stream, which was named the Esk. Passing down Eskdale, the flats increase in magnitude, stretching to the hills on either side of the stream. Two miles north-east of the first flats, is a second plain, firm and dry, which was called Rattray's Plain; and to the east again, the valley opens in the direction of Flinders' Peak.

The brushes which commenced at Mount French accompanied us in all our day's route, and, after considerably impeding our progress, completely arrested our intended course. The species of *Xanthorrhœa* seen to-day, with their extraordinary bee-hive tops, were truly superb. We halted at three o'clock: lat. at noon, 28° South: thermometer at six in the morning, 40°.

Aug. 9th.—The air mild and clear: thermometer at 50°. We proceeded directly towards the high peak of Flinders, anxiously expecting to encamp at its base; but we had not gone above two miles, when we found ourselves bewildered in dense forests of *Araucaria*, from which the only outlet was by the banks of the stream, that here, taking a sudden turn to east north-east, observed the same direction to the close of this day's journey, passing through an exceedingly broad and fertile valley, abounding in extensive ponds. At three o'clock, stopped, as usual, having walked ten miles and a half, the reduced distance being seven miles east north-east: the latitude at noon 27° 55′ 41″ South, and the thermometer at sunset indicating 60°.

Aug. 10*th.*—During the continuance of this day's journey, which began at the customary hour, and with agreeable weather, we traversed some magnificent forest land, beautifully watered, and lying chiefly at the base of the high peak of Flinders' Mountain. Our halt did not take place till five o'clock, when we had travelled nearly twelve miles.

Aug. 11*th.*—A strong desire to return by the first vessel to Port-Jackson, carrying thither the largest possible collection of living plants from the banks of the Brisbane River, induced me to quit the party this morning, and to accompany Capt. Logan back to Brisbane Town. We therefore set off at eight o'clock, and, travelling all day in a due southerly direction, reached the town at night, having traversed twenty-five miles of tolerably good country. Mr. Cunningham, with three men and two oxen, proceeded to the westward, in order to connect his former survey with the present one.

From the period of my return till I embarked for Port-Jackson, I was busily employed in securing my collection of dried plants, completing that of living ones, and laying out the rest of the New Garden.

Since the above was written, Mr. Cunningham has returned, having accomplished his object of connecting his route and observations of last year with those made during the present. This he did without any difficulty; thus establishing, beyond doubt, the practicability of forming a road from the shores of Moreton Bay to the immense open country west of the Dividing Range.

CHARLES FRASER.

SYDNEY, 5*th February*, 1829.

[TAB. LV.]

HABENARIA CORDATA.

Habenaria *cordata;* foliis binis cordatis nervosis reticulatim venosis semiamplexicaulibus, spica terminali, petalis conniventibus, labello trifido laciniis lineari-lanceolatis, cornu brevissimo, tubere solitario. (TAB. LV.)

Habenaria cordata. *Br.—Spreng. Syst. Veget. v.* 3. *p.* 691.

Orchis cordata. *Willd. Sp. Pl. v.* 4. *p.* 28.

Satyrium diphyllum. "*Link in Schrad. Diar. Bot.* 1799. *p.* 323."

HAB. Muris apud Vicum "Arco de Santo Gorge," et in rupibus apud "Entraza," in ora septentrionali Insulæ Madeiræ. *Rev. R. T. Lowe.*

Radix e tubere solitario ovali, fibrisque paucis, simplicibus, flexuosis, subtomentosis. *Caulis* basi decumbens, dein erectus, spithamæus, succulentus, diphyllus. *Folia* basi semiamplexicaulia, tenuia, membranacea, siccitate pellucida, pulcherrime reticulata, cordata; *inferius* triplo majus, late orbiculari-cordatum, patens, 3–4 uncias longum, nervis 3 primariis, 2-que secundariis parallelis: *superius* ovato-cordatum, subacuminatum, costatum, nervisque subsex notatum. *Flores* in spicam subdensam, terminalem congesti. *Bractea* germinis longitudine, lineari-lanceolata. *Petala* vel perianthii *foliola* 5, erecta, subconniventia, elliptico-lanceolata, uniformia; *labellum* erecto-patens, obovato-oblongum, basi in cornu brevissimo productum, ad medium usque trifidum, laciniis lineari-lanceolatis, obtusis. *Capsula* clavata, tricostata. *Anthera* ovalis, bilocularis, loculis basi paululum divaricatis. *Glandulæ massæ pollinis* nudæ.

Hitherto, I believe, this curious species of *Habenaria* has only been described by Link in Schrader's Journal, and as a native of Portugal. Two years ago, I had the satisfaction of receiving well-dried specimens of this species, gathered in the

Island of Madeira by my friend Mr. Lowe. They vary somewhat in size; but, in all, the lower of the two leaves is very large in proportion to the size of the plant, and is as large, as orbicular, and as delicate in structure as those of the *Habenaria orbiculata* of North America.

Tab. LV. *Fig.* 1, Plant:—*nat. size.* *Fig.* 2, Flower and bractea. *Fig.* 3, Anther and stigma. *Fig.* 4, Labellum; —more or less *magnified.*

[TAB. LVI.]

ON A NEW SPECIES OF CASTELA;

Communicated by Dr. Nicholson, *from Antigua.*

Diœcia Octandra. Nat. Ord. Ochnaceæ. *DC.*

Gen. Char. *Cal.* parvus, 4-fidus. *Pet.* 4, ovalia, concava, patentia, dentibus calycinis alternantia. Masc.: *Stam.* 8, disco hypogyno parvo inserta: *Filam.* filiformia: *Antheræ* inversæ. *Pistillum* abortivum, minutum. Fæm.: *Stam.* abortientia 8, filamentis brevibus. *Pist.* globosum, profunde 4-lobum, disco hypogyno insertum: *Stylus* vix ullus: *Stigmata* 4, recurvata, basi unita. *Drupæ* 4, patentes, e lobis 4 germinis, demum liberis. *Albumen* tenue. *Cotyledones* foliaceæ. *Radicula* supera.—Planta *valde amara.*

Castela *Nicholsoni,* (*Hook. MSS.*) foliis ellipticis mucronulatis subtus ramulisque incano-sericeis, spinis axillaribus, staminibus hirsutis. (Tab. LVI.)

Hab. In collibus aridis calcareis Insulæ Antiguæ, ubi *Goatbush* Nigritiis vulgo appellatur. *Th. Nicholson, M. D.*

Frutex 4-pedalis vel ultra, sempervirens. *Caulis* ramosissimus; *rami* patentes, spinis brevibus axillaribus armati, ramulis teretibus, incano-sericeis. *Folia* alterna, sparsa, hic illic fasciculata, subsessilia, coriacea, elliptica, supra nitida æruginosa, subtus incano-sericea, marginibus revolutis, apiceque mucronata. *Flores* parvi, crocei, dioici.

Pedunculi axillares, brevissimi, uniflori vel biflori. Masc.: *Cal.* ad basin fere quadrifidus, laciniis ovatis munitis, coloratus, persistens. *Pet.* 4, obovata, patula, caduca: *Filamenta* 8, brevia, pilosa, receptaculo carnoso inserta: *Antheræ* oblongæ, didymæ vel sagittatæ, dorso ad germen versæ, flavæ. Fæm.: *Cal.* et *Cor.* ut in mare. *Germina* 4, contigua, unum vel duo sæpe abortientia: *Stylus* brevissimus aut nullus: *Stigmata* 4, patentissima, subulata. *Stam.* 8, brevissima, abortiva, hirsutissima, disco, ad basin germinis, insidentia. *Drupæ* 4, (sed vix unquam ad maturitatem perveniunt,) subglobosæ, basi acuminatæ vel breviter pedicellatæ, patentissimæ, maturæ puniceæ, magnitudine *Cerasi minoris.* *Nux* compressa, obovata, bivalvis, rugosa, unilocularis. *Semen* suspensum, subovatum, compressum. *Albumen* paucum, tenue, carnosum. *Embryo* magnitudine fere seminis: *Radicula* parva, supera: *Cotyledones* planæ, foliaceæ. (*Nicholson in litt.*)

Dr. Nicholson, together with an interesting collection of plants from the Island of Antigua, was so obliging as to communicate specimens and a drawing of the plant which I have here given, under the idea that it might be a new species of *Simaruba*, of the Natural Order of *Simarubeæ.* On consulting, however, the figures of the genus *Castela*, belonging to the closely allied order of *Ochnaceæ*, it is quite evident that it belongs to that genus, and I am anxious to dedicate the species to its discoverer, from whom we confidently expect still more valuable information relative to the botany of Antigua.

The only two species of this genus hitherto known, are given by Turpin in the 7th vol. of Annales du Muséum d'Hist. Naturelle, p. 78. t. 5. f. A and B. The one species, *C. depressa*, has reflexed leaves, cordate at the base, and glabrous stamens; while the second, *C. erecta*, found indeed in the Island of Antigua by Richard, is distinguished by infra-axillary spines, and by its brown, not at all hoary and downy branches. It is quite clear, therefore, that our present species cannot be confounded with them. Dr. Nicholson observes, that "it is a beautiful little shrub, especially when

in fruit. The hoary and almost silvery stems and under surface of the leaves, with the rich green of their upper surface, and the handsome cherry-coloured drupes, afford a pleasing contrast with the vegetation around it; for it is found growing in the utmost luxuriance in an arid calcareous soil, where every thing else is burnt up; an additional proof of the utility of the covering of plants, in preventing the too rapid exhalation of their juices."

The whole plant is intensely bitter; a farther evidence of its affinity with the *Simarubeæ* and the genus *Quassia.* The drawing was made by Mr. Adams of Antigua.

TAB. LVI. A, Portion of a female plant. B, Portion of a male plant:—*nat. size.* *Fig.* 1, Unexpanded flower. *Fig.* 2, Female flower, with its abortive stamens. *Fig.* 3, Single abortive stamen. *Fig.* 4, Stamens of a male flower. *Fig.* 5, Single stamen. *Fig.* 6, Drupe. *Fig.* 7, Drupe cut open to show the nut. *Fig.* 8, Section of the nut to show the seed. *Fig.* 9, Section of the seed. *Fig.* 10, Embryo. *Fig.* 11, Leaf:—all more or less *magnified.*

[TAB. LVII. LVIII. LIX. LX.]

JACK'S MALAYAN MISCELLANIES.

[VOL. I. PART I.]

DESCRIPTION OF MALAYAN PLANTS,

BY

WILLIAM JACK.

ZINGIBER GRACILE. *W. J.*

MONANDRIA MONOGYNIA. Nat. Ord. SCITAMINEÆ.

Z. *gracile;* foliis glabris, scapis erectis, spicis cylindricis gracilibus coloratis, bracteis ovatis acutis, corollæ labio trilobo, lobo medio bifido.

Native of Pulo Penang.—*Stem* erect, somewhat recurved, round and smooth. *Leaves* alternate, subsessile on their sheaths, broadly lanceolate, 6 or 7 inches long, acuminate, very entire and smooth, shining above. *Sheaths* smooth, with a long scariose ligule often lacerated on the edge. *Scapes* erect, a foot high, invested with alternate sheaths. *Spikes* cylindrical, oblong, imbricated with bright red, ovate, acute bracteas, shorter than the flowers: an inner bractea or involucre surrounds the base of each flower. *Calyx* shorter by one-half than the corolla, membranaceous, curved, cleft on one side. *Corolla* yellowish-white; *exterior limb* 3-parted, longer than the inner one; laciniæ acuminate, the upper one longer and incumbent; *interior limb* unilabiate, *lip* 3-lobed, middle lobe bifid, with reflexed margins. *Anther* terminating in an incurved horn. *Ovary* 3-celled, many-seeded. *Style* filiform, longer than the horn of the anther, embraced at the base by two linear corpuscules.

AMOMUM BIFLORUM. *W. J.*

A. biflorum; foliis lato-lanceolatis glaberrimis, caule ancipiti, spicis bifloris.

Native of Pulo Penang.—A slender delicate species. *Stem* erect, somewhat recurved, 3 feet in height, compressed, doubly edged. *Leaves* alternate, bifarious, shortly petioled upon their sheaths, broadly lanceolate, acuminate, narrow at the base, entire, very smooth, the middle nerve somewhat pubescent. *Sheaths* striated, slightly tomentose, with a short, round, ciliated ligule. The base of the leaf-bearing stem is swelled into a *tuber*, which throws out horizontal shoots of some feet in length, as thick as a quill, and invested with membranous sheaths, running under ground, and sending up from their joints a number of biflorous *peduncles* or *scapes*, which are enveloped in bracteal sheaths. *Flowers* generally 2, one appearing after the other; at the base of each is a single lanceolate, acute, reddish bractea; besides which, a tubular bractea or involucre surrounds the base of the *germen*, membranaceous, half as long as the calyx, and deeply cleft on

one side. *Calyx* superior, tubular, 2–3 cleft. *Corolla* white, tubular, upper part of the tube villous within; *exterior limb* membranaceous, 3-partite, segments nearly equal; *interior limb* unilabiate, lip broader above, rounded, thickened, and yellow in the middle. *Filament* of the stamen broad, incumbent. *Anther* short, thick, 2-lobed, crowned with an erect, 3-lobed crest. *Style* filiform. *Stigma* infundibuliform. *Nectaries* 2, linear, at the base of the style. *Ovary* 3-celled, many-seeded.

(This approaches to *A. Cardamomum*, but differs from it in various points. Jack speaks of no process of the filament.—*Wallich.*)

PSYCHOTRIA MALAYANA. *W. J.*

PENTANDRIA MONOGYNIA. Nat. Ord. RUBIACEÆ.

P. malayana; foliis lato-lanceolatis, stipulis indivisis, paniculis terminalibus corymbosis, corollæ fauce villosa.

Byumbada. *Malay.*

(P. aurantiaca. *Wall. in Roxb. Fl. Ind. v.* 2. *p.* 165. *et inter addend. p.* 574.—*Wallich.*)

Native of Pulo Penang.—A *shrub* with round, smooth branches. *Leaves* petiolate, opposite, broadly-lanceolate, 10 inches long, acuminate, decurrent upon the petiole, entire, very smooth. *Petioles* short, thick, round, surrounded at the base by a prominent ring, from which a thick rib diverges on each side, and unites with a similar one from the base of the opposite leaf to form the nerve of the large, interpetiolar, ovate, acute stipule. *Panicles* corymbose, terminal. *Flowers* numerous. *Bracteas* broad, membranaceous, embracing. *Calyx* superior, erect, 5-fid. *Corolla* white, with greenish *limb*, infundibuliform, longer than the calyx, mouth closed with dense white hairs, *limb* 5-parted, somewhat reflexed, laciniæ ovate. *Stamens* 5, erect, inserted on the tube; *filaments* very short; *anthers* linear. *Style* filiform; *stigmas* 2, thick and linear. *Capsule* inferior, 2-celled, 2-seeded.

RONDELETIA CORYMBOSA. *W. J.*

PENTANDRIA MONOGYNIA.

R. corymbosa; tetrandra, pedunculis plerumque terminalibus dichotome corymbosis, floribus unilateralibus, foliis obovato-lanceolatis.

(R. spicata. *Wall. apud Roxb. in Fl. Ind. v.* 2. *p.* 139. *et inter addend. p.* 574.)

Native of Pulo Penang.—*Stem* erect, shrubby, 4–6 feet in height, with somewhat compressed villous branches. *Leaves* opposite, petiolate, obovato-lanceolate, acute, attenuated to the petiole, entire, punctated above with callous dots, villous below. *Petioles* short, thickened at the base. *Stipules* interpetiolar, long, erect, tongue-shaped, obtuse, villous, with a thick middle rib, formed by the union of one from each axil. *Peduncles* terminal and from the upper axils, supporting dichotomous corymbs, composed of unilateral spikes. *Flowers* erect, sessile, disposed alternately in a double series. *Calyx* superior, 4-cleft, with short acute laciniæ. *Corolla* white, tinged with red, funnel-shaped, much longer than the calyx, faux naked, *limb* erect, 4-partite, laciniæ subrotund. *Stamens* 4, inserted into the faux: *filaments* very short: *anthers* linear. *Style* filiform, exserted. *Stigma* bifid. *Capsule* crowned with the calyx, 2-celled, many-seeded, with central placentæ.

PHYTEUMA BEGONIFOLIUM.

PENTANDRIA MONOGYNIA. Nat. Ord. CAMPANULACEÆ.

P. begonifolium; foliis semi-cordatis inequilateralibus serratis, spicis unilateralibus axillaribus revolutis. (TAB. LVII.) *

P. begonifolia. *Roxb. Hort. Beng. p.* 85. *et* (*Fl. Ind. v.* 2. *p.* 108.)

(Pentaphragma begonifolium. *Wall. Cat. of Mus. of E. Ind. Comp. n.* 1313.)

Pulo Penang.—A small herbaceous plant. *Stem* procum-

* *Fig.* 1, Flower. *Fig.* 2, Corolla. *Fig.* 3, Stamen. *Fig.* 4, Style and stigma:—all more or less *magnified.*

bent, 1–2 feet long, thick, villous chiefly at the summit, with fasciculated hairs. *Leaves* alternate, petiolate, semicordate, inequilateral, turning to one side, 8 inches long, acute, with gross subspinescent serratures, villous beneath, adult leaves smooth above, nerves generally dichotomous. *Petioles* thick, round, furrowed above. *Stipules* none. *Peduncles* axillary or supra-axillary. *Flowers* unilateral, erect, arranged in 2 rows on a recurved spike, nearly sessile, crowded. *Bracteas* cuneiform, obtuse. *Calyx* semi-superior, ovate, villous, 5-lobed, lobes obtuse. *Corolla* white, campanulate, persistent, *limb* recurved, 5-lobed, lobes obtuse; after flowering, the lobes become green and enlarged. *Stamens* 5, erect, short, inserted on the calyx, and opposite to its divisions. *Anthers* linear, acute. *Ovary* surrounded by the calyx, and connected with it by 5 longitudinal septa or processes, from which the *stamens* spring, 3–4-celled, many-seeded; placentæ from the inner angles of the cells. *Style* short, thick. *Stigma* large, thick, 3-lobed. *Capsule* 3–4-celled, containing numerous *seeds*, arranged on convex placentæ.

The septa which unite the calyx and ovary appear continuous with the filaments of the stamens. The young parts of the plant are densely villous, but the hairs are easily rubbed away. In drying, the plant assumes a bright yellow colour. It appears extremely doubtful whether this plant be truly referable to *Phyteuma;* it does not, however agree well with any other genus of the family of *Campanulaceæ,* and it will deserve consideration whether it ought not to constitute a new genus in that order.

CURCULIGO SUMATRANA. *Roxb.*

Hexandria Monogynia.

C. *sumatrana;* foliis lato-lanceolatis plicatis glabris, spicis densis brevibus, tubo perianthii bacca longiore.

Involucrum. *Rumph. Amb. v.* 6. *p.* 114. *t.* 53. Kalapa Puyn. *Malay.*

Sumatra and Pulo Penang.—*Root* composed of fibres, proceeding from a tuber. *Leaves* radical, petiolate, ovato-

lanceolate, acuminate, attenuated to the base, plicato-nervose, very entire, smooth. *Petioles* erect, channelled above, keeled beneath, sheathing at the base. *Spikes* radical from among the sheaths of the petioles, erect, dense, much shorter than the petioles. *Flowers* erect, sessile, appressed to the rachis, each furnished with an ovate, acuminate, membranaceous spatha. *Calyx* none. *Corolla* yellow, superior, *limb* spreading, 6-parted; laciniæ lanceolate, acute, tube impervious, being a thick solid column, on the summit of the *germen*. *Stamens* 6, erect, opposite to the laciniæ of the corolla. *Anthers* linear. *Style* short. *Ovary* 3-celled, many-seeded. *Capsule* baccate, ovate, 3-sided, containing 8–10 ovate, black *seeds*, which are imbedded in pulp.

I found at Singapore another species, agreeing in most respects with this, but having hirsute leaves.

LORANTHUS COCCINEUS. *W. J.*

L. coccineus; floribus spicatis tetrandris, spicis axillaribus erectis, foliis subovatis glabris. (Tab. LVIII.) *

Found at Singapore.—*Branches* long, vimineous. *Leaves* alternate, oblong, ovate, subcordate at the base, attenuated towards the apex, which is obtuse, entire, smooth. *Petioles* short. *Spikes* axillary, solitary or in pairs, erect, longer than the leaves. *Flowers* sessile, closely pressed to the rachis before expansion. A single, small, ovate, ferruginous *bractea* is situated at the base of each flower. *Calyx* superior, nearly entire, scarcely toothed. *Corolla* coccineous, 4-petaled, erect, tubular, *limb* spreading, *petals* nearly linear, broadest at the base. *Stamens* 4, red, erect, inserted into the middle of the petals, and equalling them in length. *Anthers* oblong, adnate, red. *Style* red, erect, scarcely longer than the stamens. *Stigma* obtusely capitate. *Berry* ovate, elongated above, 1-seeded. *Seed* contained in a hard shell, 4-sided, its apex

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* *Fig.* 1, Flower. *Fig.* 2, Flower, from which the corolla and stamens have fallen. *Fig.* 3, Stamen and petal:—*magnified.*

immersed in gluten, into which the radicle shoots. *Embryo* inverse, the *radicle* produced beyond the *albumen.*

This species is nearly allied to the *L. pentapetalus* of Roxburgh, agreeing with it in habit and inflorescence.

LORANTHUS FERRUGINEUS. *Roxb.*

L. ferrugineus; ferrugineo-villosa, foliis ellipticis obtusis supra glabris, pedunculis fasciculatis axillaribus 2–6 floris, floribus tetrandris extus ferrugineo-villosis. *Roxb. Hort. Beng. p.* 87. (*ejusd. Fl. Ind. v.* 2. *p.* 207.) (Tab. LIX.) *

Sumatra, &c.—A parasitic *shrub*, which attaches itself firmly to branches of trees, by means of its long runners, and numerous circular bands. The *branches* are long and hanging, and when young, densely covered with reddish ferruginous wool. *Leaves* opposite, on short petioles, coriaceous, elliptical, obtuse, entire, smooth and green above, ferruginous and densely villous beneath. *Stipules* none. *Peduncles* fascicled, from 1–4 in each axil, 2–6 flowered. A small scale-like *bractea* embraces the base of the ovary. *Calyx* (if any) an entire margin, crowning the ovary. *Corolla* covered externally, as well as the peduncles and ovary, with ferruginous tomentum, green and smooth within, tubular, divisible into 4 *petals*, which commonly adhere at their base, but separate at the *limb*, which is generally more deeply cloven on one side. *Stamens* 4, inserted into the tube, and nearly as long as the limb. *Filaments* flat, deep purple. *Style* as long as the corolla. *Stigma* subrotund. *Berry* ovate, ferruginous, 1-seeded.

NEPHELIUM LAPPACEUM.

Rambutan. *Malay.* N. lappaceum. *Marsd. Hist. Sumat. p.* 4.

Frequent throughout the Malay countries and islands.—A *tree. Leaves* alternate, pinnate; leaflets generally 5–7, ovate, acute at both ends, very entire, smooth. *Panicles* terminal, erect. *Flowers* numerous, small, white, male and

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* *Fig.* 1, Flower. *Fig.* 2, Segment of the corolla with its stamen:—*magnified.*

hermaphrodite. *Calyx* 4–6 parted, spreading. *Corolla* none. *Stamens* 5–8, spreading, longer than the calyx, inserted into a disk below the germen. *Anthers* subrotund. *Ovary* 2-seeded, abortive in the male flowers. *Style* 1. *Stigmas* 2, revolute. *Fruit* geminate, one commonly abortive, its rudiment remaining at the base of the perfect one, which is subrotund, covered with a coriaceous rind, and echinate with long soft spines, 1-seeded, the *seed* covered with a white acid pulp.

The fruit is much esteemed, and has an agreeable subacid flavour. The parts of this flower vary much in number; six is perhaps the most frequent number of stamens. There is but one style, not two as commonly described. The affinities of this tree appear little understood. It doubtless belongs to the family of *Sapindi*, and is closely related to *Scytalia*, as justly conjectured by the author of the botanical articles in Rees' Cyclopædia.

SAPINDUS RUBIGINOSUS. *Roxb.*

Octandria Monogynia.

S. rubiginosus; arborescens, inermis, paniculis terminalibus, calycibus 5-phyllis, corollis 4-petalis, baccis tribus connatis oblongis.

Kalit layn. *Malay.*

Pulo Penang.—Arborescent. *Leaves* alternate, abruptly pinnate; leaflets nearly opposite, subsessile, ovato-lanceolate, obtuse with a small mucro or point, very entire, nearly smooth, with a few scattered hairs, chiefly on the under surface. *Petioles* tomentose. *Panicles* terminal, erect, composed of numerous simple racemes. *Pedicels* short, generally in pairs. *Bracteas* subulate. *Calyx* 5-leaved, leaflets subrotund, concave, the 2 outer ones smaller. *Corolla* white, 4-petaled, somewhat longer than the calyx; *petals* ovate, obtuse, appendiculate at the base, appendices furnished with 2 transverse lines of white hairs. *Stamens* 8, of which the 5 upper and longer ones are incumbent over the remaining 3. *Filaments*

villous: *anthers* oblong, yellow. *Style* 1, short, persistent. *Stigma* capitate, 4-sided, villous. *Germens* 3, 1-seeded. *Berries* 3, connate at the base, purple, oblong, 1-seeded.

MELIA EXCELSA. *W. J.*

Decandria Monogynia.

M. excelsa; foliis pinnatis, foliolis integerrimis, paniculis coarctatis axillaribus foliis paulo longioribus.

Pulo Penang.—A lofty *tree*, with straight trunk and light grey bark. *Branches* rough with the vestiges of the fallen foliage, leafy at their summits. *Leaves* crowded, disposed in a spiral manner, pinnate with an odd one, which is often wanting; leaflets subopposite, oblong-lanceolate, inequilateral, obtusely acuminate, very entire, smooth, shining above. *Petioles* round, smooth and thickened, somewhat scaly at the base. *Panicles* axillary, ascending, rather longer than the leaves, not diffuse. *Flowers* pedicellate, pedicels bracteolated. *Calyx* very small, 5-parted. *Corolla* white, 5-petaled, spreading; *petals* linear. *Staminiferous tube* erect, gibbous at the base, 10-dentate, 10-furrowed, as if consisting of 10 united filaments. *Anthers* 10, oblong, yellow, within the mouth of the tube. *Style* as long as the tube. *Stigma* capitate.

MICROCOS TOMENTOSA. *Smith in Rees' Cycl.*

Polyandria Monogynia. Nat. Ord. Tiliaceæ.

M. tomentosa; foliis trinerviis subtus villosis. (Tab. LX.)*

Grewia paniculata. *Roxb. Hort. Beng. v.* 3. *p.* 93.

Native of Pulo Penang.—A moderately sized *tree*, with rough bark, the *branchlets* villous and ferruginous. *Leaves* alternate, shortly petioled, elliptico-oblong, broader above, with a short acumen, 3-nerved, dentate, serrated towards the apex, scarcely pilose above, densely villous beneath, the

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* *Fig.* 1, Flower. *Fig.* 2, Stamen. *Fig.* 3, Pistil. *Figs.* 4, 5, Petals. *Fig.* 6, Drupe:—*magnified.*

hairs divaricated, and often stellated. *Stipules* linear, generally bifid. *Panicles* terminal. *Flowers* for the most part in threes, involucred with deciduous, 3-fid, and linear bracteas. *Calyx* 5-leaved, spreading, leaflets oblong, concave. *Corolla* yellow, less than the calyx; *petals* ovate, unguiculate, and without nectaries. *Stamens* numerous, inserted below the germen. *Germen* stipitate. *Drupe* containing a nut, marked externally with 5 lines, 3-celled, 3-seeded.

This agrees perfectly with the excellent description given by Sir J. E. Smith, in Rees' Cyclopædia, from a specimen preserved in the herbarium of the younger Linnæus, unaccompanied with any notice concerning its native country, and also deficient in fruit. Its affinity to the original species of *Microcos* is fully proved, on actual examination of the fruit, and this exact coincidence affords a farther confirmation of the propriety of separating *Microcos* from *Grewia*. The terminal inflorescence and involucral bracteas form a peculiar and distinctive character: in this species, the flowers are generally 3 together, and are surrounded by 3 trifid bracteas, within which are found 3 other smaller and linear ones.

MICROCOS GLABRA. *W. J.*

M. glabra; foliis trinerviis serratis glabris.

Found on the Island of Carnicobar. It nearly resembles *M. tomentosa*, differing chiefly in its smooth foliage: the *inflorescence* and *fruit* are entirely similar. Young branches tomentose: there are frequently flowers in the uppermost axils.

MIMOSA JIRINGA.

M. jiringa; arbor inermis, foliis conjugato-pinnatis, foliolis 3-jugis glaberrimis, paniculis fasciculatis axillaribus, capitulis paucifloris, leguminibus maximis articulato-contortis nigris.

M. Djiringa. *Roxb. Hort. Beng. p.* 93. Bua Jiring. *Malay.*

Pulo Penang, Malacca, &c.—A lofty *tree*, unarmed, with grey bark and round smooth *branches*. *Leaves* alternate,

conjugato-pinnate; *leaflets* 3-paired, on short thick pedicels, ovato-lanceolate, very entire and smooth, the upper pairs larger. *Petioles* round, somewhat keeled; an indistinct gland at the base of the common petiole. *Capitula* few-flowered, panicled; *panicles* fasciculate, axillary, or in the axils of fallen leaves. *Flowers* white. *Calyx* 5-toothed. *Corolla* twice as long as the calyx, 5-cleft. *Stamens* numerous, monadelphous, long, fertile. *Style* as long as the stamens. *Legumes* solitary, very large, almost black, about a foot long, spirally contorted, articulate, 2-valved; articulations subrotund, 1-seeded, convex and prominent on both sides. *Seeds* large, subrotund, doubly convex.

This species belongs to the genus Inga of Willdenow.

CLERODENDRUM MOLLE. *W. J.*

Didynamia Angiospermia.

C. molle; caule erecto tetragono, foliis cordatis acuminatis integerrimis tomentosis, panicula terminali, tubo corollæ calyce vix longior, calyce fructus ampliato carnoso albo.

Frequent in Sumatra, Pulo Penang, &c.—A *shrub*, 3–6 feet high, erect, but little branched: *stem* 4-sided, villous. *Leaves* opposite, petiolate, cordate, acuminate, very entire, softly tomentose. *Panicle* terminal, oppositely trichotomous, erect, with leaf-like bracteas. *Calyx* 5-parted, tomentose, laciniæ ovate, acute, erect, with reflexed margins. *Corolla* tomentose without, tube as long as the calyx, *limb* 5-partite, spreading, secund, laciniæ nearly equal, crisped at the margin. *Stamens* exserted, horizontally deflexed to each side. *Style* erect, as long as the stamens. *Stigma* bifid. *Calyx* of the fruit flat, enlarged, fleshy, and white. *Berry* 1–4 seeded, according to the number that prove abortive.

This species approaches nearest to *C. infortunatum*, but is sufficiently distinguished by the softness of its leaves, which are larger and more deeply cordate, by the comparative shortness of the tube of its corolla, and by the white calyx of the fruit.

Besides this species, I have met with another in various

parts of these Islands, and particularly at Acheen, which has been figured in Andrews' Botanical Repository, under the name of *C. pyramidale.* It is a large showy plant. A still more beautiful species, and perhaps the most elegant of the whole genus, is the *C. nutans*, so named by my friend Dr. Wallich, Superintendent of the Botanic Garden at Calcutta, who received it from the north-eastern frontier of Bengal. I found it not uncommonly at Pulo Penang, and this is not the only instance in which I have had occasion to observe a coincidence between the plants of these distant countries. This species is characterized as follows:

C. nutans; (*Wall.*) foliis lanceolatis acuminatis glabris, paniculis longissimis terminalibus nutantibus, pedunculis remotis divaricatis paucifloris.

The panicles or racemes hang gracefully from the extremity of the branches; the flowers are white, not numerous; the peduncles, or primary divisions of the panicle, being remote, opposite, divaricated, short, and seldom bearing more than 3 flowers. It is called *Unting-unting* by the Malays.

(This plant I find to be distinct from the *Sylhet* species, and call it *C. Jackiana.* I have a third species, with nodding panicles, (*C. penduliflorum,*) which is a native of Tavoy.—*Wall.*)

GMELINA VILLOSA. *Roxb.*

G. villosa; spinosa, foliis rhomboideis subtus villosis, racemis terminalibus, bracteis magnis acuminatis, drupis sphæricis dispermis.

Radix Deiparæ. *Rumph. Amb. v. 2. p. 124. t. 39.* Kayo-Briang.

Native of Sumatra, &c.—Arborescent. *Leaves* opposite, broadly ovate, sometimes obscurely 3-lobed, rather obtuse, entire, smooth above, villous beneath as well as the petioles and branchlets. *Racemes* terminal. *Bracteas* large, ovate, acuminate. *Calyx* obliquely 4-toothed, marked externally with 6 green scutellæ or pustules. *Corolla* yellow, ventricose. *Anthers* 2-lobed. *Ovary* 4-spermous. *Drupe* with a 2-seeded nut.

VITEX ARBOREA. *Roxb. Hort. Beng. p.* 46.

DIDYNAMIA ANGIOSPERMIA.

V. arborea; arborea, foliis ternatis, foliolis ovato-lanceolatis integerrimis subtomentosis, paniculis terminalibus, bracteis calyce longioribus.

Lubbun. *Malay.*

Sumatra, &c.—A *tree,* with somewhat 4-sided *branches. Leaves* opposite, petiolated, ternate, sometimes quinate; *leaflets* ovato-lanceolate, acuminate, quite entire, rigid, covered with a very short tomentum. *Petioles* long, thickened at the base, pulverulent. *Panicles* terminal: *flowers* subsessile. *Bracteas* opposite, ovato-lanceolate, acute, tomentose, longer than the calyces. *Calyx* 5-dentate, tomentose, persistent. *Corolla* cærulescent, or nearly white, longer than the calyx, contracted and almost closed at the mouth; *limb* bilabiate, upper lip 2-lobed, lobes diverging, lower lip larger, 3-lobed, the lateral lobes reflexed, the middle one larger, subrotund, concave, tomentose at the base, and of a deeper blue than the rest. *Stamens* 4, didynamous, ascending, longer than the corolla. *Style* longer than the stamens. *Stigma* bifid. *Berry* black, juicy, containing a 4-celled, 4-seeded *nut.*

The wood of this tree is very hard, and employed by the inhabitants of Sumatra in the construction of their houses. They consider an infusion of the bark as a useful application in cases of ophthalmia.

SPHENODESME. *W. J.*

DIDYNAMIA ANGIOSPERMIA. Nat. Ord. VITICES. *Juss.*

Calyx tubulosus, 5-dentatus. *Corolla* 5-loba, subirregularis. *Stamina* 4–5, exserta. *Ovarium* 4-loculare, 4-sporum. *Bacca* monosperma. *Flores* fasciculati, involucrati.

SPHENODESME PENTANDRA. *W. J.*

S. pentandra; foliis oblongo-ovatis glabris, involucris 5–6 phyllis, fasciculis 6–7 floris, floribus pentandris.

Roscoea pentandra. *Roxb. Cat. Hort. Beng. p.* 64. (Congea. *Roxb. Corom.* 3.—*Wall.*)

Native of Pulo Penang.—A climbing *shrub*, with 4-sided, somewhat pilose *branches*. *Leaves* opposite, petiolate, oblong-ovate, subcordate at the base, acuminate, (sometimes with a retuse acumen,) very entire, smooth. *Petioles* short, pilose. *Fascicles* 6–7-flowered, peduncled, disposed in panicles at the extremity of the branches, and in the upper axils. *Involucres* consisting of 5–6, oblong, obtuse, membranaceous, reticulated *leaflets*, which are longer than the sessile flowers. *Calyx* campanulate, 5-plicate, 5-dentate. *Corolla* infundibuliform, faux villous; limb 5-lobed, nearly regular. *Stamens* 5, long, exserted. *Style* filiform, bifid. *Ovary* very hairy, 3–4-celled; cells 1-seeded.

There is always one leaflet less in the involucre than the number of flowers in the fascicle, the central flower having no fulcrum. This species was sent to Dr. Roxburgh from Sylhet, and by him called *Roscoea;* that name, however, being preoccupied, a new one has become necessary. I have therefore given it that of *Sphenodesme*, (*fasciculus alatus.*)

(Mr. Jack's shrub is certainly different: I call it *Congea Jackiana.—Wall.*)

STERCULIA COCCINEA. *Roxb.*

MONADELPHIA DECANDRIA.

S. coccinea; foliis oblongo-lanceolatis obtuse acuminatis glabris, racemis axillaribus et lateralibus nutantibus, laciniis calycinis linearibus patentibus, folliculis coccineis.

Native of Pulo Penang.—A large, smooth *shrub*. *Leaves* at the summits of the *branches*, alternate, petiolate, 8–10 inches long, oblongo-lanceolate, obtusely acuminate, abrupt at the base, entire, smooth on both sides. *Petioles* thickened at both ends. *Racemes* lateral, from among the leaves at the end of the branches, drooping; *flowers* alternate, pedicellate; *pedicells* articulated. *Tube* of the calyx somewhat ventricose; limb 5-parted, laciniæ linear, with revolute margins, twice as long as the tube, spreading. *Corolla* none. *Stamens* 10, sessile on the stipes of the germen. *Ovary* stipitate on a column as long as the tube, subrotund, 5-lobed, crowned

with a declinate *style*. *Stigmas* 5, linear, revolute. *Fruit* composed of 5, nearly equal, crimson follicles, each of which contains 2–3 *seeds*, enveloped in a black, pulpy *arillus*.

Dr. Roxburgh's *S. coccinea* is a native of Sylhet, and is said to have panicled flowers, and 4–8-seeded follicles. My plant, however, agrees so well in every other respect, that I cannot consider it to be really distinct, as those differences may be merely the effect of a less favourable situation.

(On comparing specimens of both trees, I have ascertained the species of my late very dear friend, W. Jack, to differ from that of Roxburgh. I call it *S. lævis*. The same observation applies to the plant immediately following. Roxburgh's *S. angustifolia* does not agree with it; and I have therefore separated Mr. Jack's tree, as a distinct species, to which I have given the name of *S. Jackiana.—Wall.*)

STERCULIA ANGUSTIFOLIA. *Roxb.*

S. angustifolia; foliis lanceolatis superne latioribus acuminatis subtus villosis, racemis extra-axillaribus nutantibus, laciniis calycinis linearibus apice connexis.

Unting-unting Besar. *Malay.*

Native of Pulo Penang.—A *tree; branches* covered with ferruginous wool. *Leaves* at the summits of the branches, alternate, petiolate, lanceolate, broader above, acuminate, narrowing to the base and there rounded, entire, smooth (in adult leaves) above, covered beneath with stellated hairs. *Petioles* thickened at both ends, ferruginously villous, as well as the nerve of the leaf. *Stipules* linear, acute, shorter than the petiole, deciduous. *Racemes* (*panicles?*) near the extremity of the branches, lateral or extra-axillary, branched, lax, ferruginous. *Bracteas* linear-lanceolate, acute. *Calyx* deeply 5-parted, tomentose, laciniæ long, linear, acute, connected at their points and gaping at the sides, greenish yellow, with a red spot at the base. *Corolla* none. *Stamens* 10, on a curved column. *Ovary* stipitate, tomentose, 5-lobed. *Style* declinate. *Stigma* 5-lobed.

A great proportion of the flowers are male, and I have not seen the perfect fruit. Dr. Roxburgh's plant was a native of Chittagong.

CALLA HUMILIS. *W. J.*

MONOECIA MONANDRIA.

C. humilis; acaulis, foliis ellipticis supra glabris, pedunculis 4–5 ex axillis foliorum petiolis brevioribus.

Kladee ayer. *Malay.*

Pulo Penang, &c.—A small stemless plant, growing under the shade of forests, 5–6 inches high. *Root* a leaf-bearing tuber, which sends out numerous, long, villous fibres. *Stem* none, except the above-mentioned tuber, which is everywhere invested with the sheaths of the petioles. *Leaves* erect, petiolate, elliptical, ovate, rather obtuse, with a subulate acumen, slightly cordate at the base, entire, with a pellucid crisped margin, smooth and green above, somewhat hoary beneath, with villous papillæ. *Petioles* shorter than the leaves, channelled above, sheathing and dilated into a waved margin at the base. The bases of the sheaths are often perforated by the fibres of the root. *Peduncles* 4–5, axillary, 1-flowered, shorter than the petioles, furnished with membranous sheaths at the base. *Spathas* of an obscure red colour, oblong, convolute, acuminated, as long as the spadix. *Spadix* cylindrical, entirely covered with florets, male above and female below, for about a quarter of its length. *Anthers* numerous, subrotund, yellow, sessile. *Germens* ovate. *Styles* very short. *Stigmas* obtuse, peltate. A few *anthers* are intermingled with the *pistils*. *Capsules* membranaceous, globose, somewhat 4-lobed, (2-celled?) generally 8-seeded. *Seeds* somewhat kidney-shaped, arranged round the *axis*.

CALLA ANGUSTIFOLIA. *W. J.*

C. angustifolia; acaulis, foliis lanceolatis utrinque glabris acutis, pedunculis 4–5 ex axillis foliorum petiolis brevioribus.

Pulo Penang.—A small plant of the same size as, and nearly related to, the preceding. *Leaves* radical, petiolated, lanceolate, acute at both ends, entire, smooth. *Petioles* sheathing at the base. *Peduncles* 4–5, axillary, 1-flowered. *Flowers, &c.* exactly as in the preceding.

These two species are so closely allied, that it is doubtful if they may not be considered as varieties.

CALLA NITIDA. *W. J.*

C. nitida; foliis ovato-lanceolatis acuminatis, scapis compressis foliis brevioribus, baccis monospermis.

Pulo Penang.—A large subcaulescent species. *Leaves* 1–1½ foot long, ovato-lanceolate, acuminate, very entire, very smooth, with numerous parallel nerves proceeding from a middle rib. *Petioles* sheathing nearly their whole length. *Scapes* compressed, smooth, shorter than the leaves. *Spadix* invested by the *Spatha,* covered with *florets,* male above, female beneath. *Berries* oblong, large, 1-seeded.

FLACOURTIA INERMIS. *Roxb.*

F. inermis; arborescens, inermis, floribus hermaphroditis fasciculatis axillaribus, foliis ovatis serratis glabris.

Koorkup. *Malay.*

Sumatra and Pulo Penang.—A *tree* of moderate size. *Leaves* alternate, shortly petiolated, ovate, obtusely acuminate, with large blunt serratures, very smooth, lucid, 6–8 inches long. *Peduncles* fasciculate in the axils, many-flowered. *Flowers* hermaphrodite. *Calyx* 4-leaved, spreading, somewhat tomentose, leaflets subrotund, sharpish. *Corolla* none. *Nectary* composed of numerous, small, subrotund, orange-coloured glands, situated at the base of the calyx and surrounding the stamens. *Stamens* numerous, (20–30,) hypogynous, longer than the calyx; *filaments* white; *anthers* yellow, roundish. *Ovary* superior, ovate, crowned with 4–5 short, thick, diverging *styles; stigmas* capitate, 2-lobed.

Berry reddish-purple, with a juicy acid flesh, in which are imbedded 8–10 *pyrenæ*, according to the number of the styles.

The fruit of this, though rather too acid to be eaten raw, is esteemed for tarts and pies.

ROTTLERA ALBA. *Roxb.*

R. alba; foliis rhomboideo-ovatis subtus incanis, paniculis terminalibus laxis, fructibus stellato-pilosis spinis mollibus echinatis.

Baleangin. *Malay.*

Sumatra and Pulo Penang.—A *tree* of moderate size: *branches* roundish, furfuraceous with appressed stellated hairs. *Leaves* alternate, petiolate, rhomboidal-ovate, often approaching to 3-lobed, long-acuminate, rounded and biglandular at the base where the petiole is inserted within the margin, remotely denticular towards the apex, smooth and green above, hoary and tomentose beneath. The young leaves have stellate deciduous hairs on their upper surface. *Petioles* long. *Stipules* none. *Panicles* terminal or from the bifurcations of the branches, peduncled, lax, and drooping. *Flowers* small, numerous, shortly pedicelled. *Bracteas* small, and, together with the peduncles and calyx, sprinkled with furfuraceous tomentum.

Male. *Calyx* 3-phyllous, leaflets ovate, acute. *Stamens* numerous in the centre of the flower. *Anthers* subrotund.

Female. *Calyx* 4, sometimes 5-partite, erect, laciniæ acute. *Styles* 3, diverging, hirsute above. *Stigmas* simple. *Fruit* tricoccous, beset with soft flexible spines, and covered with stellated hairs, 3-seeded. *Seeds* subrotund, attached to the superior and internal angle of the cells.

(To be continued in the future Numbers of this Work.)

[TAB. LXI.]

BYTTNERIA HETEROPHYLLA.

PENTANDRIA MONOGYNIA. Nat. Ord. BYTTNERIACEÆ. *Br.*

GEN. CHAR. *Cal.* 5-partitus, petaloideus, persistens. *Pet.* 5, basi dilatato-saccata, apice longe mucronata. *Stam.* 10, filamentis basi connatis; *alternis* sterilibus petaloideis, *alt.* fertilibus, subulatis, simplicibus. *Antheræ* utrinque rima laterali dehiscens. *Styli* 5, (coadunati.) *Ovarium* 5-loculare, loculis 3–4-ovulatis. *Caps.* 3–5-valvis. *De Cand.*

Byttneria *heterophylla* (*Hook.*); scandens, foliis cordatis brevi-acuminatis integris lobatis palmatisque, petalis longe mucronatis bidentatis basi attenuatis.

Telfairia volubilis. *Newman in litt.*

Heterophyllum ramosum. *Bojer, MSS.*

HAB. In monte Tannanarivou, provinciæ Emirne, Ins. Madagascar. *D. Prof. Bojer.* Cult. in Ins. Mauritii. *D. Newman.*

Frutex volubilis. *Caules* longissimi, valde ramosi, teretes, subvillosi, rami juniores versus apices subscabri. *Folia* petiolata, late cordata, brevi-acuminata, integra vel lobata, lobis latis, acutis, vel palmatim tri-quinquepartita; subtus paululum pubescentia, 3–5-nervia, costata, subtus ad basin uniglandulosa, et in axillis venarum pubescentia. *Paniculæ* axillares, pubescentes, breves, solitariæ vel subfasciculatæ, subcorymbosæ, patentes vel cernuæ; *ramuli* ultimi umbellati, bracteis paucis involucriformibus, linearibus suffulti. *Calyx* profunde 5-partitus, sepalis lanceolatis, patentissimis, coccineis, extus pubescentibus. *Pet.* 5, erecta, flava, dorso rubescentia, convexo-saccata, utrinque dente vel appendicula patenti aucta, inferne attenuata, superne mucrone vel appendice subulata, petali longitudine, subciliata terminata. *Stamina* in urceolum connata, petalis multo breviora. *Filamenta* 10, quorum 5 abortiva,

petaliformia, apice recurva, 5 alternantia breviora, filiformia vel subulata. *Antheræ* didymæ. *Pollen* viride, subglobosum, tuberculis tribus notatum. *Pistillum* (abortivum) globosum, 5-lobum, pubescens. *Styli* in unum filiforme coadunati. *Stigma* simplex.—*Newman in litt.*

Most of the above is copied from a description made from living plants in the Island of Mauritius, and communicated to me, together with a drawing and specimens, by Mr. Newman, Curator of the Royal Botanic Garden in that island, as a new genus, under the name of "*Telfairia volubilis.*" M. Bojer, who discovered the plant in Madagascar, had previously sent it to me as "*Heterophyllum ramosum.*" *MSS.* But upon carefully comparing the structure of the flowers with those of *Byttneria,* I could not discover sufficient characters to warrant its separation from that genus. Mr. Newman, indeed, considers the plant to be diœcious; and it is certain that the blossoms do not bear fruit in the Mauritius: but the flowers contain a pistil, to all appearance, perfectly formed.

It is remarkable not only for the variously shaped leaves that occur, as well on different plants as upon the same individual, and for its extended growth. "This singular and gigantic *Creeper,*" says M. Bojer in his letter to me, "inhabits the province of Emirne, in the interior of the Island of Madagascar, where it covers, with its most extensive branches, a great portion of the western side of the mountain *Tannanarivou.* In no other spot have I seen it, nor have I met with the ripe fruit. Its flowers much resemble those of *Theobroma Cacao,* (or *Chocolate Tree,*) and they fall off soon after their expansion."

Fig. 1, Flower. *Figs.* 2, 3, Petals. *Fig.* 4, Stamen combined into a cup-shaped nectary. *Fig.* 5, Stamen. *Fig.* 6, Grain of pollen. *Fig.* 7, Pistil, (abortive:)—*magnified.*

[TAB. LXII.]

ON A NEW GENUS OF THE NATURAL ORDER OF TILIACEÆ, FROM THE ISLAND OF MADAGASCAR.

Communicated by PROFESSOR BOJER *of the Mauritius.*

VINCENTIA TRIFLORA.

POLYANDRIA MONOGYNIA. Nat. Ord. TILIACEÆ.

GEN. CHAR. *Cal.* 5-sepalus, sepalis reflexis, tortuosis, demum deciduis. *Cor.* pentapetala. *Petala* 5, apice bifida, basi squama instructa. *Torus* pentagonus. *Stam.* numerosa, libera, toro stipitiformi inserta. *Germen* 1, ovatum, hispidum. *Stylus* 1, persistens. *Stigma* 4-fidum. *Capsula* globosa, indehiscens, (vel *drupa* sicca,) 4-pyrena. *Nuces* loculis 5, vel, abortu, uniloculares, monospermæ. *Semina* horizontalia, pyriformia, compressa. *Albumen* 0. *Cotyledones* planæ. *Radicula* ad hilum seminis versa. *Bojer.*

Vincentia *triflora. Bojer, MSS.* (TAB. LXII.)

Crescit in sylvis depressis ad ripas fluminis *Marou-vóaii* dicti in sinu Bombatac, ad oras occidentales Insulæ Madagascar. *Bojer.*

Arbor procera, non raro 30-pedalis, et ultra, facie *Ulmi campestris.* *Truncus* brevis, cortice crasso donatus, ut in *Tilia europæa,* valde ramosus. *Rami* alterni, elongati, patentes vel penduli, versus apices flexuosi et virides, glabri. *Stipulæ* subulatæ, deciduæ. *Folia* alterna, petiolata, ovali-oblonga, *juniora* longe acuminata, grosse serrata, basi obtusa; *adultiora* magis cordata, undulata, 4-pollicaria, 2 uncias lata, glaberrima, nitida, basi trinervia, venisque minutis transversalibus, supra viridia, subtus pallidiora, venæque magis prominentes. *Petioli* breviusculi, graciles. *Pedunculi* axillares, solitarii vel bini, apice triflori. *Flores* pedicellati, terni, ante florationem bractea late ovata, membranacea, nitida inclusa. *Alabastra* oblonga,

fere cylindracea, hirsuta. *Calyx* e sepalis vel foliolis 5, linearibus, extus fasciculato-pilosis, intus flavis, glabris. *Petala* oblonga, flava, apice bifida, ad basin squama concava, margine piloso, aucta. *Torus* obconicus, pentagonus, carnosus. *Stamina* petalis longiora. *Filamenta* subulato-filiformia. *Antheræ* ovales, biloculares. *Germen* ovatum, pilis erectis rigidis undique tectum. *Stylus* staminibus paulo longior, filiformis. *Stigma* 4-fidum, segmentis angustis. *Capsula* globosa, magnitudine fere *Cerasi minoris*, setoso-verrucosa, intus succo gelatinoso elastico farcta, non pulposa, 4-pyrena. *Nuces* erectæ, trigonæ, subquadriloculares. *Loculi* transversi, nunc abortientes, materia cellulosa circumdati, monospermi. *Semina* nitida, pyriformia, compressa, pallide fusca, basi funiculo umbilicali inserta, apice nigro-maculata. *Albumen* nullum. *Cotyledones* plano-compressæ, carnosæ. *Radicula* ad hilum seminis versa. *Bojer.*

This genus has been named by its intelligent discoverer, Professor Bojer, in honour of M. John Vincent, an eminent advocate of the Mauritius, and a great cultivator and patron of Natural History, especially of Botany, in that island.

The above description was kindly communicated to me through Charles Telfair, Esq., by Professor Bojer of the Mauritius, accompanied by a most beautiful drawing, executed in the island, by Madame Bernard.

M. Bojer notices the affinity of this genus with *Grewia* and *Columbia;* differing from the latter in its wingless capsules, and from the former in its crustaceous capsule, its many *cells* within each nut, and transverse *seeds*, attached to the inner angle of each cell.

Fig. 1, Petal. *Fig.* 2, Flower from which the floral coverings are removed, showing the torus, stamens, and pistil. *Fig.* 3, Pistil. *Fig.* 4, Ripe fruits. *Fig.* 5, The same cut round transversely to show the nuts. *Fig.* 6, A nut. *Fig.* 7, The same cut through vertically. *Fig.* 8, Seed. *Fig.* 9, Transverse section of a seed:—all but *figs.* 4, 5, 6, more or less *magnified.*

SOME REMARKS ON THE SPECIES OF THE GENUS CITRUS, WHICH ARE CULTIVATED IN JAMAICA. By JAMES MACFADYEN, M. D., Jamaica.

THE genus *Citrus* is so generally diffused, and its species have so long been submitted to the investigations of science that it may appear strange if we assert that many points connected with its history still remain to be elucidated. The botanists of Europe have in general been limited in their observations to individuals reared in orangeries and conservatories, where the natural habits and characters of these plants can never be properly developed. They have consequently been led into errors, into which they never could have fallen, had they visited countries where the different species grow in a state of nature. Thus the *Lime* and the *Lemon* are set down by almost all systematic writers as belonging to the same species; the *sweet* and the *bitter Oranges* are considered as distinct; while of the *Shaddock* and the *Forbidden Fruit* they know little or nothing.

The genus *Citrus* belongs to the natural order AURANTIACEÆ, the 33d of the Jussieuan System, as altered by De Candolle. The generic characters are, " Proportion of the parts of the *flower* quinary. *Cal.* urceolate, 3–5-fid. *Petals* 5–8. *Stamens* 20–60, with the *filaments* compressed, more or less united at the base, so as to be polyadelphous: *Anthers* oblong. *Style* cylindrical. *Stigma* hemispherical. *Fruit* a *berry*, 7–12-locular; the *Cells* many-seeded, with the *Seeds* imbedded in a pulp. The cuticle of the seed membranaceous, *Auriculæ* of the *Cotyledons* very short.

The species which compose this genus are *Trees* or *Shrubs*, furnished for the most part with axillary *spines*.

1. *C. Medica*, (the *Citron.*) *Petioles* naked. *Leaves* oblong, rounded at the apex, (very rarely acute.) *Stamens* 35–40. *Fruit* oblong, with the rind thick, and rugose on the surface.

Syn. *Malus Medica*, (Theophrastus, l. 4. c. 4.); *Malum Mediæ*, (Virg. Georg.); *Otrodj* (of the Arabians.)

This is an arborescent *shrub*, the lowest of the genus, seldom attaining, in an open situation, more than eight feet in height. It divides near the root in an irregular manner; the *branches* are long, subsimple, at first nearly erect, afterwards, from the weight of the fruit, decumbent. Extremities of the young branchlets compressed, smooth, with a faint violet tinge. *Spines* horizontal. *Leaves* 6 inches long, and 2 broad; oblong, rounded at the apex, (very rarely acute,) serrulato-crenate, glabrous, pellucido-punctate, with dots excavated on the upper surface. *Colour* yellowish green. *Petiole* one-third of an inch, naked, incrassated. *Peduncles* very short, axillary, solitary, one-flowered. *Calyx* sub-5-dentate, with the teeth erect. *Corolla* 5-petaled. *Petals* oblong, obtuse. *Stamens* about 40 or less, of unequal lengths. *Nectary* surrounding the base of the style, 5-gonal, green. *Stigma* bilobular. The *fruit* is externally yellow, rough. The *rind* is divisible into 2 layers: that which is external is formed of an infinite number of vesicles filled with an essential oil; the other, which is internal, is thick, white, composing the principal part of the bulk of the fruit. The *pulp* is enclosed in a diaphanous membrane, and arranged into several compartments. These compartments are many-seeded.

This species has a great resemblance in its mode of growth and other characters to the *C. Limonum*. It is distinguished by the larger size of its leaves, and by these being of a more oblong figure. They are, also, distinctly serrated; and for the most part rounded at the apex. In the present species, also, the axillary spines spread out nearly horizontally, whilst in the *Lemon* they are patent, forming with the stem an angle of 45°.

The *Citron* is a native of Media. It passed from thence into many of the provinces of Persia, and in course of time became known to the Greeks. About the same period also it began to be cultivated in Judea. It has been conjectured by many commentators, from the circumstance of Jews at the present day carrying *Citrons* to the Feast of Tabernacles, that it was the fruit "*Hadar*" spoken of in the 23d chapter, 40th

verse of the book of Leviticus. "Sumetisque vobis die primo *fructus arboris pulcherrimæ* (Hadar) spatulasque palmarum, et ramos ligni densarum frondium, et salices de torrente, et lætabimini coram Domino Deo vestro." Hence, also, on the old Samaritan coins, *Citrons*, attached to a palm, may be observed on one side. Josephus likewise notices this custom as of great antiquity. Thus, on one occasion, when Alexander, the king and high priest, stood at the altar, the people revolted, and threw at him the *Citrons* they bore in their hands.

It is probable, however, that no particular fruit was alluded to, and that it was not till the days of Solomon, when their intercourse with distant countries became extensive, that the *Citron* was made known to the Jews. As for the Greeks, they seem to have been acquainted with it at an early period, as we find a very precise description of it in the writings of Theophrastus.

The *Citron* is used only in confections. It contains but little pulp, and the juice is less acid than that of the *Lemon.* The *rind* is its most valuable part, affording, on expression, a considerable proportion of essential oil.

2. *C. Limonum*, (the *Lemon.*) *Petioles* sub-alate, oblong, narrowed towards the apex, remotely crenato-serrate. *Stamens* 30–35. *Fruit* oblong, with the *rind* thin, and the *pulp* very acid.

Syn. *Limoun* (of the Arabians); *C. Limon* (Miller's Dictionary); *C. Limon* (Linnæus, Sp. Pl.)

This is a *tree*, rather taller than the *Citron;* seldom, however, exceeding 10–12 feet in height. In growth it is very irregular. The *branches* spring from near the bottom of the *stem*, are rather long, and angular towards their extremities, which, when young, have a violet tinge. *Spines* long, axillary, patent. *Leaves* oblong, at the base rounded, narrower towards the apex, remotely crenato-serrate, smooth, yellowish green, with green dots. *Petiole* rather more than half an inch in length, subulate. *Flowers* axillary, solitary, or in a raceme, from 2–6-flowered. *Peduncle* rather shorter than the *petiole*. *Pedicels* with the green portion very short, a bractea beneath

each pedicel, minute, subulate. *Calyx* 5-toothed. *Petals* 4, previous to expansion tinged with violet. *Filaments* subulate, more or less united, in 2 ranks; the inner a line shorter than the outer; 30–35 in number. The *Fruit* ovoid, mammillose at the apex, with the *pulp* arranged in 9–11 cells, the parenchyme which contains it adhering firmly to the *rind.*

This, as well as those species of the genus which still remain to be noticed, was unknown to the ancients. We seek in vain for any notice of it in the writings of antiquity. It might, at first sight, be supposed that the *Golden Apples* of the Hesperides had some reference to them. These islands are, at the present day, known by the name of the Canaries or Fortunate Islands, and are situated off the western coast of Africa. But no voyager has noticed *Oranges* or *Lemons* as growing there, till within a recent date; and those which are now found, bear evident marks of having been introduced, and are only met with in the neighbourhood of Europæan settlements.

As the *Orange*, the *Lemon*, and the other species, therefore, (with the exception of the *Citron*,) were unknown to the Greeks and Romans, we have reason for inferring that they are natives of a country into which the arms of these victorious nations did not penetrate. As they never extended their conquests beyond the Ganges, we are probably not far from the truth when we consider China and the adjacent countries as the regions to which these fruits are indigenous; the objects of cultivation to a people who can date their civilization from a remote period.

It was not till the æra of the Crusades that these fruits became known to the inhabitants of Europe. The Arabs, under the influence of fanaticism, had spread their conquests over the greater part of Asia. In their progress, they met with many exotic plants, and, amongst others, with those under consideration, which their love of luxury, as well as their fondness for medicine and agriculture, soon prompted them to transplant into the districts whence they had come. According to Abd-Allatif, an Arabian traveller, the first seeds of these fruits were brought from India in the 300th year of

the Hegira, and sown in Oman, whence they were afterwards conveyed to Palestine and the shores of the Levant. It was probably by the same warlike people that they were first propagated in Spain, as well as in their possessions in Northern Africa.

It is not wonderful that these fruits attracted the curiosity of the Crusaders of the north. Returning to their homes and families, they carried with them some seeds of the productions, which, in a distant country, had excited their admiration. It was thus that the orchards of Europe became enriched, not only with individuals of the *Orange* kind, but with other fruit trees, such as the *Apricot* of Alexandria, and the Damascene *Plum.* These foreign fruits were more especially cultivated by the monks; the most refined as well as most luxurious class of the community in those days. Even at the present time, where the climate permits, these plants are always in great numbers about monastaries, occupying a principal place in the garden.* I need scarcely add, that their cultivation is now carried on in every civilized country, the desire of possessing them having, in cold climates, first led to the idea of erecting buildings capable of producing an artificial climate, such as is suited to the growth of plants of more favoured regions.

The rind of the *Lemon,* like that of the *Citron,* abounds with an essential oil. The fruit is principally esteemed, however, for its agreeable acid juice, adapted as a condiment both for animal and vegetable substances. It has been found during long voyages a preventive against scurvy, and is said to be an antidote to vegetable poisons. It is of great importance, serving as a mordant for fixing vegetable reds. Thus large quantities are employed in Turkey-red dyeing, and for the purpose of freshening the colour yielded by the *Carthamus tinctorius.*

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* There is an *Orange* in the court of the convent of St. Sabina at Rome, which is still alive, although it is said to have been planted six hundred years ago, by the hands of Saint Dominic.

3. *C. Lima*, (the *Lime.*) *Petioles* with the alæ narrow. *Leaves* oval, obtuse, obscurely crenulate. *Stamens* 25. *Fruit* subglobose; *pulp* acid.

Syn. *Lime de Naples. Limocello di Napoli. Limon Calaber.* Lime.

This is a *tree* of shrubby growth; occasionally attaining from 15 to 20 feet in height. The principal *branches* rise from the bottom of the stem. *Branchlets* compressed, glabrous, green. *Leaves* oval, not acuminate, obtuse, obscurely crenulated towards the apex, with a minute tooth in each indentation. *Petiole* alate, with the wings narrow. *Spines* axillary, in a direction between patent and horizontal. *Raceme* axillary. *Peduncle* about the length of the petiole, generally 6-flowered. *Bracteæ* at the base of the pedicels, minute. *Calyx* regularly 5-fid or 5-dentate. *Petals* 5, subæqual, linear-lanceolate, white. *Stamens* 25, rarely approaching 30, the short stamens being for the most part wanting. *Fruit* sub-globose.

One of the principal uses to which this tree is applied, is the formation of hedgerows, for which few plants are better adapted, whether we regard beauty or utility. The fruit of it is used for the same purposes as the *Lemon.* The acid, however, is more abundant, and purer, the juice containing but a slight proportion of vegetable matter. The plant itself appears to have been known at an earlier period than any of the other species, with the exception of the *Citron.* Thus, according to Theophrastus, it was with difficulty that Harpalus could bring the *Lime* and *Box-tree* to grow at Babylon.

It is mentioned by some writers, that the fruit of the *Lime de Naples* is without seed. This is not the case in this country, the seed being constantly present, and large, in proportion to the size of the fruit.

4. *C. Limetta*, (*Sweet Lime.*) *Petiole* sub-alate. *Leaves* ovate, serrate. *Stamens* 30. *Fruit* globose, crowned with a boss-like projection; *rind* firm; *juice* sweet.

Syn. *Limo dulcis. Limetta Bergamotta. Peretta. Sweet Lime.*

This, unlike the former, has the habit of a *tree.* Its cultivation is by no means general.

5. *C. Aurantium.* Var. *α. C. dulcis,* (*Sweet Orange.*) *Petiole* subalate. *Leaves* ovato-sublanceolate, slightly acuminate, with a blunt point. *Stamens* 20–22. *Fruit* globose; *rind* thin; *pulp* sweet.

Syn. *Narendj,* (Avicenna.) *Arangi,* (Langue Romaine.) *Melarancio,* (early Italian writers.) *Aurantium,* (Miller.) *Oranger,* (French.) *Orange,* (English.)

This is a *tree,* often attaining 24 feet in height. *Branches* for the most part erecto-patent. *Leaves* alternate, petiolated, ovato-sublanceolate, slightly acuminate, with a blunt point, and near the apex a few crenatures. *Petiole* winged, or subalate. *Spines* axillary. *Flowers* axillary, peduncled, for the most part solitary. *Calyx* 3-fid; divisions obtuse. *Corolla* of 4 petals, linear-lanceolate, obtuse, white. *Stamens,* generally 22. *Fruit* yellow, smooth; *rind* thin; *pulp* white, sweet.

6. Var. *β. C. vulgaris,* (*Bitter Orange.*) This differs little from the preceding variety. The *leaves* are more acuminate, and partake more of the lanceolate figure. The *alæ* of the petioles are broader. The *calyx* is, for the most part, regularly 5-fid, with the divisions acute. *Petals* 4–5. *Stamens* 22. *Peduncle* minutely pubescent. *Fruit,* as in the former, globose; *rind* more rough, and having a deeper shade of red; *pulp* acrid.

Although to the practised eye it is easy to distinguish between these two varieties, it is difficult to say in what the distinctive marks consist. In general, the *bitter Orange* is a tree of a more vigorous growth, the stem is taller, and the leaves are larger and of a deeper green, with the crenatures more distinct. The calyx is also more regularly 5-fid, and the petals 5 in number, and subæqual.

We have already mentioned that the *Orange*, with the *Lemon* and other species, became known to Europe during the Middle Ages. We have reasons for concluding that it was only the bitter-fruited variety with which they were then acquainted, and that it was not till an after period that the *sweet Orange* was introduced. Thus, all the old established orange groves of Spain, as those at Seville, planted by the Moors, are of this sort. The Arabian writers, also, always describe the *Orange Tree* as producing a fruit with an *acrid* juice. We are informed that the first *sweet Orange* was reared in the garden of the Count de St. Laurent, at Lisbon. Hence this fruit has come to be generally known by the name of the *Portugal Orange*. It is probable that the seeds were procured from China; the Portuguese, previous to this, having discovered the route to India by the Cape of Good Hope.

By many writers, the *sweet* and the *bitter Orange* are considered as belonging to the same species, the qualities of the former being the effects of cultivation and grafting. The seed of the *sweet Orange* comes up, indifferently, either a tree resembling that from which it was taken, or one producing *bitter* fruit. There is, however, this fact to be taken into consideration, that the seed of the *bitter Orange* is never known to grow into a tree of the *sweet* variety. In this respect, the *Orange* resembles the *Apple;* the seed of the *Crab* producing a tree of its own kind; whilst that of the *Golden Pippin*, or any other cultivated variety, gives birth to a fruit of both descriptions; the one, though inferior to the fruit of the parent tree, yet sweet, and the other small and sour, and though not corresponding exactly, yet making a near approach to the *Crab*.

We may partly account for this distinction among *Oranges*, by inquiring whether there be any circumstances which favour the raising of the *sweet Orange* from seed. It may be remarked of all fruits, into whose composition the saccharine principle enters largely, that these acquire the sweetness and flavour for which they are esteemed, most readily, in a limestone district. It is only in such situations that the *Vine* can

be cultivated with success. This is equally the case with the *Orange*. Thus, the finest in Jamaica are raised on the white limestone of the Parish of St. John, and in no part of the world are *sweet Oranges* produced in such abundance as in Manchester. The rocks which compose the south-west boundary of Blue Mountain Valley are of the same formation; and it is remarked of an estate in that district, that the seeds of *Oranges*, sown by the negroes there, turn out uniformly *sweet*. On the contrary, in the neighbourhood of Bath, where rocks of the trap and secondary formation prevail, all the *Oranges* have more or less of acridity.

These facts lead us to the following conclusions:—1st, That the *sweet* and the *bitter Oranges* are the same species, the former, in unfavourable situations, degenerating into the latter. 2dly, That the difference between these varieties has not originally existed, but that the conversion of the *bitter* into the *sweet Orange* has been the effect of circumstances extremely propitious, combined with care and cultivation.

Uses. The *sweet Orange* is principally used for the dessert. The *bitter* variety is capable, by preparation, of forming a variety of agreeable confections. The *rind* possesses a higher degree of aroma than that of any other of the genus, and the *pulp* is used to diminish the tendency to putrefaction. The most valuable part, however, is the *flower*, from which a distilled water is obtained.*

7. *C. decumana*, (*the Shaddock.*) *Leaves* oval, rounded at the apex, sub-emarginate, crenated, beneath pubescent. *Petioles* alate. *Stamens* 30. *Fruit* very large, with the *rind* thick.

This is a *tree* about 18 feet in height, the crown flat, the *branches* divaricating. *Branchlets* compressed, angular, when young pubescent. *Leaves* 5 inches long and 2½ broad, oval,

* We have to regret that the *Orange* is not here an object of more general cultivation. In the Floridas, it has become so profitable that, according to an American writer, one acre yields 1000 dollars per annum.

rounded at the apex, sub-emarginate, crenated, midrib beneath pubescent, ciliated, above shining. *Petiole* alate, pubescent. *Alæ* ciliate, crenulated. *Spines* for the most part wanting. *Flowers* axillary. *Peduncle* pubescent. *Calyx* irregularly 5-fid, pubescent, with the divisions obtuse. *Petals* 4, linear, oblong. *Stamens* 30. *Germen* roundish, pubescent. *Style* pubescent.

Of this fruit there are two varieties.

Var. α. *maliformis ; fruit* globose, *pulp* white.

Var. β. *pyriformis ; fruit* pear-shaped, *pulp* red.

Of the above two varieties of this excellent fruit, the latter abounds most in the *sweet* principle. Unlike the *Orange*, the best *Shaddocks* are observed to grow in the wet districts.

8. *C. Paradisi*, (*Forbidden Fruit.*) *Leaves* oval, rounded, crenulated, glabrous. *Petioles* alate. *Stamens* 25. *Fruit* large.

This is a *tree* of a handsome appearance, about 30 feet in height, with *branches* sub-erect, and the apex sharp. *Leaves* oval, rounded, crenulated, glabrous. *Petioles* subalate. *Spines* for the most part short, axillary. *Flowers* peduncled, axillary, either solitary or in a raceme of from 2 to 6. *Bracteæ* one at the base of each pedicel, concave, lanceolate. *Peduncle* glabrous, half-an-inch long. *Calyx* irregularly 5-fid, faintly ciliated. *Petals* 4, linear-oblong, rounded. *Stamens* 25–26. *Fruit* sweetish, subacid.

There are also two varieties of this species.

Var. α. *pyriformis ;* Barbadoes *Grape Fruit.*

Var. β. *maliformis ; Forbidden Fruit.*

As in the *Shaddock*, the pear-shaped variety possesses most of the *sweet* principle, and is, on the whole, a preferable fruit.

JAMES MACFADYEN.

27th July, 1828.

NOTICES RESPECTING THE BOTANY OF CERTAIN COUNTRIES VISITED BY THE RUSSIAN VOYAGE OF DISCOVERY UNDER THE COMMAND OF CAPT. KOTZEBUE. By Ad. de Chamisso.

[*Translated from the German Edition of the Voyage.*]

THE PHILIPPINE ISLES.

The beautiful woods which clothe the mountains and valleys of these islands with the most luxuriant green, descend also to the very brink of the sea, in groves of *Mangle Trees* (*Rhizophora*), and some other species. The transitory glance which we were enabled to gain of these forests from the public route, and the short distance to which we penetrated their recesses, are insufficient to enable us to describe them properly. *Fig Trees* appeared to be the prevailing kind of wood: some species supporting themselves as strong trees by their singularly interwoven stems and running roots, by which they clasp the rocks and twine over them. Other plants, of very slender stalks, raise themselves to an astonishing height, and while their leafy summits are lost above the leafy roof of the grove, their singular fruit is seen bursting from the lower part of their trunks. Some species retain a frutescent habit, while others climb. We missed in the woods the beautiful forms of the *Acacia Trees*, with their variously pinnated leaves; but numerous other genera of Leguminous Plants here exhibit their peculiar characteristics. The Ferns, (particularly the arborescent ones,) the Climbers, the Orchideæ, which, in Brazil, form almost self-supported gardens in the air, slightly attached to the summits of the trees, are here either entirely wanting, as the *Cacti* and *Bromeliaceæ*, or appear in very diminished numbers. The character which Nature wears is of a much tamer kind. The species of *Palm* are more numerous than in St. Catherine's, many of them are but inconspicuous, and the slender prostrate *Rotang* is indeed the most wonderful of them all. Amongst the Aroideæ is the

Pothos scandens, whose jointed grassy stems and narrow foliage are seen creeping up the trunks of trees.

The graceful *Bamboo Cane* grows abundantly on the banks of brooks, where its thickly clustered stems are often waved by the wind, which causes these hollow reeds to emit a great variety of agreeable sounds. This plant attains its extreme height in the short course of one rainy season; during the following years it becomes woody, and shoots out lateral stems, but without any increase of size. The young sprouts are eaten like asparagus. There are several species described by Loureiro as natives of this place, but not having seen their inflorescence, we could not ascertain this point.

The plains consist alternately of woods and savannahs; but nothing can be poorer than the vegetation of the latter; consisting chiefly of two species of grass, which grow about eight feet high, and probably ripen their seeds in autumn. There are a very few dwarf plants, mostly of the leguminous tribes, and these grow under the shade of an arborescent species of *Bauhinia* which appears singly at considerable intervals. These savannahs are often set on fire, both to prepare them for cultivation, and that they may produce younger vegetation for the cattle.

A particular species of *Musa* (*Banana* or *Pisang*), of which the fruit is not esculent, is cultivated for the sake of its fibrous stem, and considered preferable to many others. The filaments (being the long vessels of its peduncle) extend the whole length of the stem, which is generally about eight feet; and they are of various degrees of fineness, according to their outer or inner situation. Thus the same plant affords the fibres of which are made the excellent anchor cables, almost exclusively employed by the Spanish vessels here, and that more delicate flax which is used in the manufacture of the fine striped cloths of which the cleanly people of these islands make very elegant shirts.

Another *Palm* grows here, (*Palma de Cabello negro:*) it yields a strong, black, coarse fibre, much esteemed for ropes and cables, and far preferable to what is obtained from the *Rotang,* which, though employed by the Chinese and many

of the islanders of the Pacific Ocean, is considered as of little value, and not to be depended upon. This *Palm Tree*, on the contrary, is much cultivated, and, with the *Bamboo* and *Rotang*, constitutes one of the most useful plants of this part of the world.

THE MARIANNE ISLANDS.—GUAJA.

This island is well wooded, its Flora seems rich, and the vegetation luxuriant. Forests clothe its steep descents to the sea shore, and in several sheltered spots the *Mangle Trees* (*Rhizophora*) actually dip their pendent boughs in the flood. Nothing can exceed the delicious perfume which was wafted to us across the waters, while we were sailing about in search of an anchorage. The *Orange Trees* grow wild, as do many other kinds of fruit trees, memorials of a once flourishing cultivation. Several species of plants formerly introduced here, now vie in luxuriance with the indigenous inhabitants of the soil; such as the prickly *Limonia trifoliata*, and the *Indigo Shrub* (*Indigofera tinctoria*), the use of which even is now unknown. The *Breadfruit*, *Cocoa*, and *Pisang* (*Banana*), are most abundant; the *Mango* (*Mangifera indica*) grows well where it was planted, but does not become naturalized. Of the various species of plants which prevail on the continent of Asia and the islands of the Pacific Ocean, we only found the *Barringtonia speciosa* and *Casuarina equisetifolia*. We wholly missed the forms of plants so characteristic to New Holland, the *Proteas*, *Epacrideæ*, *Myrtles*, and simple-leaved *Acacias*. On the other hand, we found most of those that grow at Radack, many of which again were wanting at Luçon; such as the *Tacca pinnatifida*, which, though a native of Cochin China and cultivated, does not appear at Manilla. Two species of *Pandanus* and many kinds of *Fig* are natives of Guaja.

RADACK, RALICK, REPITH-URUR, BOGHA.

The Flora of these islands is very scanty. On the range of Radack we found but fifty-nine species, including those that are cultivated. Twenty-three of them, five being in

cultivation, we had before seen at O-Waihi; and twelve, including the *Cocoa Tree*, were collected at the Island Romanzoff, where we gathered in all but nineteen species. About twenty, again, we found at Guaja. Neither the *Orange* nor *Cabbage Palm*, both of which have, on doubtful testimony, been stated to grow on the Mulgrave Islands, could we find; nor learn any thing with certainty about them.

We do not however believe that the vegetation of Radack is confined to the above-mentioned number of plants; but rather think that both on this island itself, and the groupe of which it forms a part, and which we had not the opportunity of thoroughly investigating, many individuals may have escaped our search. The southern islands, in particular, which we did not visit, (Arno, Meduro, and Millé,) which have an older vegetation and much richer soil, are likely to produce many species which are wanting to the more northern and barren groupe. Vegetation appears on this chain of islands to have commenced in the south, and followed the course of the inhabitants, in a northerly direction.

The most useful *Palm* found here is the common *Pandanus* or *Screw Pine* of the South Seas, (*Wob.*) It grows wild in the most arid sands, where vegetation first commences, and enriches the soil by its numerous decaying leaves, which it throws off in great numbers. In the moist lowlands of the richer islands, it thrives equally well, and numerous varieties of it are cultivated with care, being propagated by layers, and their fruit much improved by culture. All of these, if increased by seed, reassume the original characteristics of the parent species, the *Eruan*. More than twenty varieties are reckoned; the difference between them existing in the various outward form of their fruit, or its compound nature, or the number of separate kernels which it contains. The male tree is always called *Digar*, the wild female, *Eruan*; each variety having a different name. That part of the fruit which is used for food by the people of Radack, is by the natives of the Sandwich, Marquesas, and Friendly Islands, employed as an odoriferous and golden-shining garland. We may here remark that the genus *Pandanus* particularly

requires strict examination, as the characters that most botanists have used to discriminate the various species are of no weight whatever. Loureiro, in his *Flora Cochinch.* expressly states that the fruit of *P. odoratissimus* is not esculent; but it constitutes the chief food of the people of Radack. Each of the seeds of which this compound fruit is composed, contains at the base where it is affixed, an aromatic juice. To obtain this, the fruit is first knocked to pieces with a stone, and then being chewed, the fibres are rejected from the mouth. The fruit is also baked in pits, as in the South Seas; not so much for the sake of eating it in this state, but that the *Mogan* may be prepared from it. This is an aromatic dry confection, which is carefully stored up for voyages. All the members of one or more families are employed together in making the *Mogan*. When the fruit has been baked, its concreted juice is carefully scraped out with the edge of a mussel-shell, then spread on some leaves over a gridiron and dried in the sun, or by a gentle fire. The thin cake thus formed, is closely rolled up, and the roll neatly wrapped and tied in the leaves of the tree. The almond of this fruit is pleasant, but being difficult to get out, it is often neglected. From the foliage of the *Pandanus*, the women of these islands prepare all sorts of mats, some to serve for their aprons, others with ornamented borders, and the coarser and thicker kinds which form the sails of their vessels, and are employed by them for bedding.

Next to the *Pandanus*, the *Cocoa Tree* (*Ni*) holds the second rank. Not only is its nut valuable as affording good oil, and forming a variety of utensils for domestic purposes, in which they carry their food and drink, but the fibres that surround the stem are employed for making cordage. The *Pandanus* gives food, and the *Cocoa Tree* the materials for navigation to these people. The manufacture of ropes is the labour of the men, and the first of the natives may be seen thus engaged. The fibres of the bark are cleansed and separated by maceration in pits of fresh water, and then spun. The wood of the old trees is reduced to powder, and formed into a paste with the juice of the unripe fruit: thus prepared and

dressed in one of the shells, it is baked over the fire. The cocoa-nut shells are the only vessels which these people possess for carrying water; they are placed in longish wicker baskets made on purpose, several being arranged side by side, with the *eyes* of the nut upwards. The *Cocoa Tree* is planted and propagated every where, both on the inhabited and uninhabited islands; but in most of the young plantations, the trees only bear fruit in the inhabited islands; where their lofty crowns are seen waving high in the air. The *Cocoa Tree* bears but very small nuts at Radack.

The *Breadfruit Tree* (*Mä*) is not very common at Radack, and is only planted in the wet and closely inhabited islands. Old trees are however met with even on some of the poorer ones. Its wood, as well as its fruit, is valuable; from it are made the keels of their boats; the other planks being chiefly formed of buoyant wood, joined together with cords of the cocoa bark, and the interstices caulked with leaves of the *Pandanus*. The *Breadfruit Tree* likewise yields a gum which is useful for different purposes. There are many varieties of this tree, as is generally the case with all cultivated plants; those produced here do not vary much from the parent species; their fruit is small, and the seeds in it frequently perfect.

An useful fibre is procured from the rind of three different species of plants, which grow wild, the principal being from a shrub of the *Nettle* family (*Boemeria?*), called here the *Aromä*, and only found on the best moist soils. The thread which the *Aromä* affords is white, extremely fine and strong. The *Atahät* (*Triumfetta procumbens, Forst.*) is a creeping plant of the *Tiliaceous* kind; it is common, and, with the *Cassytha*, covers the driest sands. From its brown bark, the material of the men's aprons is chiefly procured; they consist of stripes of bark hanging loose, and sewed to a girdle of matting. The ornamental borders of the finer mats are also made of it. The fine white fibrous bark of the *Hibiscus populneus* (*Lo*) which we saw at Radack, but only on the groupe Aur, is used in the same way. Ropes are manufactured of this bark at the Sandwich Islands, and elsewhere.

A nourishing flour is obtained from the tuberous roots of *Tacca pinnatifida*, which grows here plentifully; but it does not appear to be in general use.

The different species of *Arum*, *A. esculentum*, *macrorhizon*, and *sagittifolium*, as well as the *Banana* and the *Rhizophora gymnorhiza*, are severally cultivated, here and there, on the various islands. The culture of the *Banana* seemed to commence at Kaban; but it was only at Aur that we saw it bearing fruit. The species of *Arum* nowhere meet here with the deep boggy soil that best suits them; indeed there is nothing growing spontaneously on these islands which forms an essential part of the food of the population.

Besides these plants, there are commonly cultivated about their dwellings two of the rarest wild species, which are very ornamental; a *Sida* and a *Crinum*, whose sweet-scented flowers, with those of *Guettarda speciosa*, *Volkamæria inermis*, and at Aur the *Ixora coccinea* (?) are worn in pretty garlands around the long coiled hair and in the ears of the poor natives of Radack, who are distinguished by their general taste for elegant decorations and great fondness for perfumes.

The sea throws upon the reefs of Radack great trunks of *Fig trees* from more northerly countries, with the *Palms* and *Bamboos* of the torrid zone. It thus supplies the wood necessary for navigation, while the iron found in the wrecks of Europæan vessels affords another requisite article. The only instruments which they possess for working up the drift-wood are formed of the valuable metal thus obtained. In confirmation of the fact that much iron is thus procured, we saw a large piece of timber lying on the strand, with the iron nails still remaining, sticking in it, at a sheltered spot in Oldia, one of this groupe of islands. From the same source the natives obtain another treasure, a useful kind of very hard stone, which is found in the roots and hollows of trees cast up by the sea. Iron and stone belong to the chieftains, to whom they are compelled to deliver these articles for a trifling remuneration, under pain of punishment.

The sea also wafts to these islands the fruits and seeds of many trees, of which the greater part are not indigenous.

Most of them appear still to be in a state for vegetation, and we have frequently, with many good wishes, committed these presents to the bosom of the earth. Among them we found the fruit of that *Pandanus* which only grows in the western countries, and seeds of *Barringtonia speciosa, Aleurites triloba,* and other trees belonging to the general Flora of Polynesia, and which we have met with near the Marianne Islands. The greater number of these seeds belong to the arborescent or climbing Leguminous Plants, which grow plentifully everywhere between the tropics. Those of *Guilandina Bonduc* are very common among them; but we only saw the plant itself once, on one of the Leeward Islands. We observed that such seeds as are deposited by the waves on the reefs situated in the sheltered spots of the island, seem to vegetate more freely, being more protected from the blasts, and finding a better soil than those that are thrown up on other parts of the island. Among the rejectamenta of the ocean are frequently seen round Pumice-stones, with masses of closely tangled *Cassytha,* similar to what the *Zostera marina* forms on some of our coasts, and which are called in France, on the shores of the Mediterannean, *Plotte de mer.*

THE CAROLINE ISLANDS.

A variety of useful *Palms* from the Philippines, among them *Palma brava, Palma de Cabello negro,* &c., which, as well as the plants of the Pelew Islands, are cultivated here, give an idea of the richness of the Flora. Cap enjoys, with Pelew, the privilege of an elevated situation; among its productions we find the *Areca Palm* (*Areca Catechu,*) the *Bamboo,* and three kinds of trees which grow on the mountains, from whose timber boats are built, for which purpose the *Breadfruit tree* alone is employed on the lower islands. The *Aleurites triloba* grows here also, and the *Clove* (*Caryophyllus aromaticus*); the latter is not, however, esteemed, for the fruit is useless and bitter, and its whole appearance mean and ugly. The *Orange,* the *Sugar-Cane,* and lastly the *Curcuma,* all of which are produced at Ulea and the lower islands,

thrive here in the greatest abundance. Kadu recognised on the Sandwich Islands, and under the reefs of Radack, in many species of seeds that were drifted there, the natives partly of Cap, and partly of the lower islands of the Caroline groupe. Of all the southern islands, Feis has the best soil and richest vegetation. The *Bamboo*, whose utility caused it to be introduced there from Cap, succeeds very well; and from the same source the other islands procure many of their desiderata.

Many species not found at Radack, and boasting a more luxuriant growth, are seen at Ulea and all the southern islands of the Pacific. Luis de Torres has even carried plants from Ulea to Guaja, which were strangers to the Flora of this high district.

All these islands are rich in *Breadfruit trees*, *Bananas*, and esculent roots. The natives of the low grounds subsist chiefly on the *Breadfruit*, of which several large-fruited varieties are cultivated under different appellations; while on the higher lands, *Roots* constitute the chief support of the people: particularly those of the *sweet Potatoe* (*Camotes**) which, with seeds of other useful plants, were brought by Cayal and three of his brothers, from the Bisayas or Philippine Isles, where they are indigenous, and whence they have spread to other districts. According to Kadu, they do not succeed at Ulea. In the Pelew Islands, many varieties of *Arum* are cultivated, some of them attaining a great size; but they are almost confined to elevated situations, and thrive best at Feis.

The *Pandanus* grows on all the Carolines; but its fruit is neither eaten nor used for ornaments, and we saw none of the improved varieties. The agriculture of Cap is quite unparalleled; floating gardens of *Arum* being ingeniously constructed on the waters, with wood and drift *Bamboo*.

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* The Spaniards call the sweet roots *Camotes*, having borrowed the name from the Philippine Islands. The *Camote* of the Tagales and Bisayas was cultivated here before the conquest.

The *Pisang* (*Banana*) is here cultivated, but more for the sake of its fibres than fruit. Of the former, the women weave or plait elegant mat-like stuffs, or rather, perhaps, stuff-like mats. A piece of this fabric, when finished, is generally the shape of a Turkey shawl, one ell broad, and several ells long, with black threads interwoven at each end, forming ornamental patterns, and the ends of these threads hanging loose as a fringe. These cloths are sometimes dyed with *Turmeric*, (*Curcuma*.)

Another plant of the *Mallow* tribe yields a stringy bark, which, in some of the islands, is similarly employed in weaving.

The *Paper-Mulberry tree*, and the bark cloths of O-Waihi were unknown to Kadu. Much of the trade of Cap consists in a powder made from the rasped roots of the *Curcuma*: it is a general fashion, from Tuch in the east to Pelli in the west, to dye the skin with this powder; but this practice does not prevail in the groupe of islands situated to the south-west of the Pelews, nor at the Mariannes. The custom of preparing a sweet syrup from the sap of the *Cocoa Tree* is only known at Pelew; for drinking *cava* and using salt are alike unpractised in these islands.

THE ISLE ROMANZOFF.

The Flora here is poor in the extreme; we counted only nineteen species of perfect plants, (one *Fern*, three *Monocotyledones*, and fifteen *Dicotyledones*) and we do not think that many escaped our observation. The *Cryptogamous* plants, with which, in higher latitudes, vegetation commences, appear to be wanting here. The *Lichens* are only seen on the older trunks of trees, like a covering of dust; and the black powder which sprinkles the stones, seems not of a vegetable nature. Even a *Moss* and some *Fungi* which we found at Radack, did not appear at Romanzoff. The plants we saw were a *Polypodium*, the *Cocoa tree*, the *Screw Pine* (*Pandanus*), a *Grass*, *Scævola Königii*, *Tournefortia argentea*, *Lythrum Pemphis*, *Guettarda speciosa*, a *Cassytha*, an *Euphorbia*, a *Boerhaavia*, and an herbaceous kind of *Nettle*; all these being plants which we had found at Radack; and those which are wanting at the latter

island, are two shrubby *Rubiaceous* species, and another kind of shrub; *Heliotropium prostratum, Portulacca oleracea*, a *Lepidium* (*acre ?*) and a *Buchnera ?*

A thin vegetation, through which the ground is everywhere seen, prevails here, consisting of a few shrubs with entire-margined, simple, mostly succulent leaves and colourless flowers; these form a kind of thin brushwood, above which the *Cocoa Tree* raises itself, while the *Pandanus* is conspicuous by its singular form, entwined with the leafless, reddish stems of the *Cassytha.*

THE SANDWICH ISLES.—THE JOHNSTONE ISLANDS.

The collections of plants which Archibald Menzies, the learned companion of Vancouver, formed in his different expeditions to the heights of O-Waihi and Mauwi, are still, with many other treasures, enshrined in the herbarium of Sir Joseph Banks; and although this venerable Nestor of naturalists throws open his *Gazophylacium* to all the learned with the most unconstrained liberality, yet no one has at present undertaken to make us acquainted with the alpine Flora of O-Waihi.

The vegetation of O-Waihi has nothing in common with the adjoining continent, the coast of California. The leafless form of the *Acacias*, the genera *Metrosideros, Pandanus, Santalum, Aleurites, Dracæna, Amomum, Curcuma,* and *Tacca*, impress on it the character of their natural affinities. The families of the *Rubiaceæ, Apocyneæ*, and *Urticeæ* prevail; of the latter many wild species are used for making various kinds of bark-cloth *; and some arborescent milky *Lobeliaceæ* are also found. The immediate margin of the island produces only a few kinds of grass and herbs. In the interior, the Flora is rich; but it will bear no comparison with the luxuriant variety of Brazilian nature. Only low

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* The *Paper-Mulberry* (*Broussonetia papyrifera*) is cultivated in the Sandwich Islands, as in most of those of the South Seas, for the manufacture of cloth. But it is a mistake to suppose that it is the only plant used for that purpose.

trees are found in the vallies; among them the *Aleurites triloba*, whose whitish foliage forms a singular kind of brush around the base and the declivities of the mountains. Here and there, in the deep fissures of rocks, may be seen astonishing groves of *Bananas*, which, growing thickly, stem close-pressed to stem, cause a gloomy darkness to prevail beneath their wide spread leaves. These plants, if grown near the beach, scarcely attain a height of five feet, but in such situations as the above, they often treble that stature. The *Acacias*, from whose hollowed trunks the large canoes of the Sandwich Islands are made, attain on these mountains only to the size necessary for that purpose, and there alone is the Sandal-wood found, which is so much prized in China; while the ruler of these countries knows its value so well, that he makes it the means of inflicting poverty upon his oppressed people, who are obliged to collect it, and neglect the necessary art of cultivating the ground.

The *Tarra-root* (*Arum esculentum*), after being boiled, is stamped into a tough pulp, and constitutes the principal food of the people. O-Wahu is that one of the Sandwich Islands which produces the greatest number of esculent plants, and part of the *Tarra* used at O-Waihi is thence derived. The culture of the vallies which lie behind Hanaruru is really astonishing. Artificial irrigations enable the natives to form, even upon the hills, large aquatic plantations of *Tarra*, which are at the same time employed as fish-ponds, while all kinds of useful plants grow on the banks which form their borders. Many introduced plants are now cultivated by some of the original inhabitants; but those of the people who retain their old manners make little use of them. Among these, the *Tobacco* may be considered as the principal; and it is indeed a vegetable which the natives of all parts of the globe have shown a readiness to employ. *Water-Melons*, *Melons*, and other kinds of fruit have been gladly adopted here. Besides the destructive *cava*, a fermented liquor is prepared from the *Tea-Root* (*Dracena terminalis*); but the *Sugar-Cane* has never yet been employed for that purpose.

KAMTSCHATKA.

THE ALEUTIAN ISLANDS AND BEHRING'S STRAITS.

The cove of Awatscha, lying between the same degrees of latitude as Berlin and Hamburgh, and the haven of St. Peter and St. Paul, in the interior, seem to be but little exposed to the influence of sea winds. The arborescent *Birch* grows here; but stunted and very different from the slender elegant tree which is so much admired in the north of Europe, and particularly at Petersburgh. *Pinus Cembra,* which on our Alps grows at greater heights than *P. Abies,* and forms the boundary of the trees, *Sorbus Aucuparia, Alnus incana,* and some *Willows* are seen, but they remain quite shrubby. Timber may however be raised in the interior of the peninsula, where the climate is milder than on the east coast; and the seeds of the *Pinus Cembra,* which are eaten at the tables of Russians, come from Siberia *via* Ocholtzk.

Grasses and herbaceous plants thrive luxuriantly, the soil being rich and the sky mild. There are but few species of vegetables, and these seem about equally distributed. In shady spots grow *Spiræa kamtschatica, Allium ursinum, Maianthemum canadense, Uvularia amplexifolia, Trillium obovatum,* &c. In the pastures are a *Veratrum, Lilium kamtschaticum, Iris sibirica,* &c. On the hills, which are rocky, abound some species of *Caprifolium, Spiræa, Rosa,* the *Atragene alpina,* and other mountain plants, as *Rhododendron kamtschaticum, Empetrum nigrum, Trientalis europæa, Linnæa borealis, Cornus suecica, Saxifragæ,* &c. Some kinds of *Fern,* from the number of individual plants, form a considerable part of the vegetation. *Urtica dioica,* which was probably introduced, now seems to have established itself as a prevailing inhabitant of the soil.

The peninsula of Alaska, and the adjoining island, called Unimak, which is only separated from the continent by a narrow strait, seem to have the same character of vegetation as the main land, for trees are produced there, while Unalaschka and the other islands of this range are quite bare of them. A few miserable *Firs,* originally brought from

Sitka and planted at Unalaschka, may still be seen, most of them decayed, and the others scarcely seem likely to live; but the plantation is yet young, and it is well known how ill trees of this kind bear a removal.

As we have been thrice at Unalaschka, both in spring and autumn, and have investigated its vegetable productions with particular care, we shall make this island serve as a point of comparison whereby to describe the character of those other northerly situated countries at which we touched.

At Unalaschka, under the same latitude as Lubeck, the *Willows* scarcely grow higher than the luxuriant grass and herbs of the moist grounds. As soon as we ascend the inferior hills, a completely alpine vegetation appears; even on the least elevated regions of the mountains are some *Vaccinia*, resembling *V. Myrtillus*, which scarcely rise above the ground. Besides the brilliant verdure due to a moist atmosphere, which here adorns the grass, and enlivens even the summits of the rocks, the lustre of the fresh unsullied snow, and of some social plants, bestow on this dreary country a variety and beauty of hues which are quite delightful. *Lupinus nootkensis*, *Mimulus luteus* (Pursh), *guttatus* (Willd. En. Suppl.), *Epilobium angustifolium* and *latifolium*, *Rhododendron kamtschaticum*, &c. are among the most conspicuous. The fresh green of the turf even reminded us of the valley of Ursera.

The vegetation here appears to have nothing farther in common with that of St. Peter and St. Paul, than as respects its alpine Flora and the coast plants of these northern shores. Besides such species as are likewise found more north, we have only the *Lilium kamtschaticum*, (except indeed the variety seen at Unalaschka prove a distinct species,) and the *Uvularia amplexifolia* common to both places; while, on the contrary, we found more Kamtschatkan species of plants on the American coast, north of Behring's Straits, which we missed at Unalaschka. It is the Flora of the North-West Coast of America which descends to the base of the hills of this island, where it unites with the Arctic Flora. As examples of this, we may cite *Rubus spectabilis*, *Lupinus nootkensis*,

(which is also found, though dwarfish, on the hills,) *Epilobium luteum*, and *Mimulus guttatus* (Willd.*), *Claytonia unalaschkensis* (Fisch.), and *sibirica* (*alsinoides?* Pursh), may be also reckoned here. *Sanguisorba canadensis*, *Lithospermum angustifolium*, &c. belong to the common Flora of America.

Many species of *Grasses* thrive in the low lands, with some *Umbellatæ*, such as *Angelica*, *Heracleum*, &c. A dozen *Carices*, scarcely forming a larger proportion of the vegetation than in the north of Germany; some *Scirpi* and *Eriophora* accompany them, with a few *Junci*, in the proportion of about one to two. The *Orchideæ* constitute a groupe of some importance, both because of the number of species and the beauty of the individuals; they prevail both in the vallies and on the hills; and we counted eleven kinds: among them a beautiful *Cypripedium*. Higher north, we did not observe a single plant of this family. Of the *Ferns* we found about eight species; nearer to the Pole there is but one *Filix*, and even of this we only saw a solitary specimen. At Unalaschka there are some *Lycopodia;* in the more arctic regions but one. We found in the lakes many water-plants; *Potamogeton*, *Sparganium*, *Ranunculus aquatilis*, &c.; in the higher latitudes we observed only the two species of *Hippuris*, and the common *Callitriche.*

Two other *Ranuncula*, the *Prunella vulgaris*, a species of *Rhinanthus*, of *Cineraria*, *Achillæa*, *Plantago*, and *Geum*, some *Rubiaceæ*, a *Claytonia*, the *Menyanthes trifoliata*, a *Triglochin*, &c. belong, with the other above-mentioned plants, to the Flora of the vallies of Unalaschka. We saw also a *Bartsia*, apparently different from the *Bartsia pallida* of more northerly situations. To a beautiful plant, which constitutes a new and distinct genus, we gave the appellation of *Romanzoffia unalaschkensis*, in commemoration of the noble promoter of all science in Russia. The genera *Rumex*, *Polygonum*, *Aconitum*, *Thalictrum*, some *Alsineæ*, the *Iris sibirica*, *Geranium pratense*, *Comarum pratense*, and *Montia fontana* are distributed all over these arctic regions.

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* The seed of this species, which was raised in the Botanic Garden of Berlin, is said to be brought from Baikal.

The *Empetrum nigrum*, with *Helleborus trifolius* (Linn.), the latter being an American plant which we did not see again more to the north, are found upon most of the hills, and indicate the alpine nature of the scenery. There are also some species of *Vaccinium*, and the common *Oxycoccos*, *Arbutus alpinus* and *Uva-ursi*, with a white-flowered *Menziesia*, (probably a variety of *Erica cœrulea*,) *Rhododendron kamtschaticum*, *Azalea procumbens*, *Andromeda lycopodioides*, (which, nearer to the Pole, yields to *A. tetragona*,) the alpine *Willows*, *Silene acaulis*, *Sibbaldia procumbens*, *Cornus suecica*, *Trientalis europœa*, *Linnœa borealis*, *Ornithogalum striatum*,* *Anthericum calyculatum* (Linn., *var. borealis*), *Konigia islandica*, a *Gymnandra*, apparently different from that one found higher north, ten *Saxifrages*, three species of *Pedicularis*, some *Potentillœ*, two *Gea*, two *Anemones*, three kinds of *Primula*, a *Papaver*, a *Drosera*, a *Pinguicula*, two *Pyrolœ*, a *Viola*, a *Parnassia*, a *Rubus*, and an *Armeria*. There was but one alpine *Ranunculus*, and three *Gentianeœ;* of these genera there are more individuals in higher latitudes. Of the class *Syngenesia*, we found *Aster*, *Hieracium*, *Gnaphalium*, *Leontodon*, and *Artemisia;* this class prevails greatly as we approach the Pole, the genus *Artemisia* in particular, exhibiting many individuals. On the other hand, Unalaschka produces some alpine species of the genera *Campanula* and *Veronica*, which are entirely wanting in the north. There are some individuals of the order *Cruciferœ*, scattered partly in the hills and partly in the vallies. We did not find at Unalaschka *Alnus incana*, *Betula nana*, *Ledum palustre*, *Dryas octopetala*, *Diapensia lapponica*, *Rhodiola rosea*, the genera *Spirœa*, *Astragalus*, *Allium*, *Myosotis*, *Corydalis*, *Valeriana*, *Aretia*, *Androsace*, *Dodecatheon*, *Delphinium*, or *Orobanche;* all of which are natives of more northern latitudes.

The maritime Flora, which is unaltered in the arctic regions, consists particularly of *Elymus mollis*, (Herb. Görenk. Trinius in Sprengel's En. 2. p. 72.) *Arenaria peploides*, *Pisum*

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* There are two *varieties* of this plant, which may perhaps be distinct species.

maritimum, with various appearances of *Pulmonaria maritima* (Willd.), being probably different species, the *P. parviflora* (Pursh), *Cochlearia officinalis,* and *Arnica maritima,* which, though here very luxuriant and branched, in more northern situations is only one-flowered. To this list we may add *Potentilla anserina.* The sea along the coast and in the creeks is rich in *Algæ;* while the *Fucus esculentus* (the Sea Kale of the Russian inhabitants) is particularly observable among many gigantic species of the genus.

At Unalaschka, the *Mosses* and *Lichens* begin to assume that predominant station which they hold in all the very cold districts.

We took but a cursory view of the islands St. George and St. Paul, situated in nearly the same latitude as Riga. It is extraordinary how much more frigid does Nature here show herself than at Unalaschka. No sheltered vallies, no protected spots favour the vegetation of the plants of milder climes; but a perfectly alpine growth prevails, both on the hills and the beach. The high summits of the desolate rocks are covered with pale and black *Lichens,* while those places which are irrigated with melted snow afford only *Sphagnum,* a few other *Mosses,* and some *Carices.* There are no springs in the soil. The various arctic plants choose, according to their nature, the rocky or the moory spots; and none elevate themselves above the ground, to which they seem closely pressed. A *Lupine* at the island St. George, and an *Achillæa* at St. Paul, remind the observer of the productions of Unalaschka; but there are also several species which are not even seen in the highest parts of the latter island, such as *Ranunculus Pallasii* and *Gmelini,* an *Androsace,* and a *Claytonia.* We found only one plant peculiar to these islands, a *Cochlearia?* which is plentiful and characteristic.

The alpine or arctic Flora which here (at St. Lawrence) adorns the foot of the mountains, does not appear to entwine their brows; for when these are entirely free from snow, and the water produced by the melted snow irrigates some brilliant plants, the dry ridges and declivities of the masses of fallen rocks are only scantily attired with gray and black *Lichens.*

The mountains of these dreary climes being unprotected by any covering of vegetation, soon decompose. The frost bursts the rocks, every summer's gentle warmth causing fresh ruins, and so destruction hastens towards its completion. Wherever the abundance of *Sphagnum* has not produced a boggy turf in the deeply watered places, the ground presents only heaps of broken rocks.

The aspect of Nature at the Cove of St. Lawrence is most wintry; the scanty herbage barely covering the black soil, while the dwarfish *Willows* do not reach to one's knee. The *Andromeda polifolia* which we found there, did not exceed two or three inches in height, and was one-flowered. Among the vegetables of this Cove, we found a *Delphinium*, a *Dodecatheon*, an *Aretia*, and we saw there also the greatest number of species belonging to those truly arctic genera, *Gentiana, Saxifraga, Astragalus, Artemisia, Draba, Ranunculus*, and *Claytonia*, many of these being undescribed.

The Island of St. Lawrence, situated two degrees more to the south, does not differ in vegetation from the Cove of the same name. The *Andromeda tetragona, Dryas octopetala, Diapensia lapponica*, with some alpine kinds of *Myosotis*, and a *Gymnandra*, clearly indicate the prevailing character of its flowers. We observed, when first arriving on this island, where the vegetation is purely arctic, that we gathered in a few minutes more plants in bloom than we had observed during many weeks on that range of islands comprising Radack, &c. and situated between the tropics.

Farther northwards, on the rocky island in the interior of Kotzebue's Sound, grew the *Azalea procumbens*, as at Unalaschka and the Cove and Isle of St. Lawrence; with the alpine *Willows, Cornus suecica, Linnæa borealis*, some arctic species of *Rubus*, &c. The *Empetrum nigrum* and *Ledum palustre* cover the moorland, with the *Sphagnum*, but the *Ledum* does not here form the tall shrub which decorates the turfy bogs of the north of Germany.

The vegetation at the interior of Kotzebue's Sound is much more luxuriant than within St. Lawrence's Cove. The *Willows* are taller, the *grasses* grow stronger, all the plants

are more stout and succulent, while the greater number of species common to the American coast than appear in St. Lawrence's Cove, indicate a more temperate climate. On the island of that name, we gathered *Alnus incana*, as a very diminutive shrub, and *Spiræa chamædrifolia*, both of which we had remarked at Kamtschatka, and not on the American Island Unalaschka; and which a sterner atmosphere seems to have driven from St. Lawrence's Cove. An *Orobanche* and a *Pinguicula* are among the plants of this island. The *Cineraria palustris* grows with remarkable luxuriance in the well watered slopes formed at the base of the mounds of ice; while *Betula nana* is seen even on the very shores. The plain country of this island is free from snow throughout the summer.

[TAB. LXIII. LXIV. LXV. LXVI. LXVII.]

ON THE PLANTS OF THE NATURAL ORDER UMBELLIFERÆ,

Detected by Dr. Gillies *in the extra tropical parts of South America.*

The species of this genus, found by Dr. Gillies in South America, and chiefly in the Cordilleras, both on their eastern and western sides, are not numerous, and their illustration has been greatly facilitated by the recent labours of Hoffman, Sprengel, and more especially of Koch and De Candolle. The country in question seems to be, more particularly, the district of the *Mulineæ*, a subtribe of De Candolle, of which the genera are less satisfactorily determined than those of the other groupes of the order; and to me it appears that *Fragosa*, Ruiz et Pav. and *Pectophytum* of Kunth, should be removed from the *Hydrocotyleæ*, where De Candolle has placed them, and arranged with the *Mulineæ*.

Trib. I. HYDROCOTYLINEÆ. *Subtrib. I.* Hydrocotyleæ.

1. HYDROCOTYLE. *Linn.*

Hydrocotyle *bonariensis;* foliis orbiculatis multilobatis crenatisque, umbellis proliferis, pedunculo foliis breviore.

1. H. bonariensis. *Lamarck, Encycl.* 3. *p.* 153. *Cav. Ic. v.* 5. *p.* 60. *t.* 488. *Cham. et Schlecht. in Linn. v.* 1. *p.* 257. *Rich. Hydrocot. p.* 30.

H. multiflora et H. tribotrys. *Ruiz et Pav. Fl. Per. v.* 3. *t.* 246. *f.* A. and B.

H. umbellata, β. bonariensis. *Roem. et Schult. v.* 6. *p.* 345.

Hab. Locis humidis inter Mendozam et Buenos Ayres. *Gillies.*

This appears to be found throughout almost the whole of South America, and in the southern States of North America too, if Roemer and Schultes are correct in considering *H. umbellata* of Linn. as the same. It is indeed a very variable species in the neighbourhood of Mendoza; the young umbels are sometimes simple, sometimes proliferous, each umbel sending out many rays, or often only a single ray, which again becomes proliferous in the middle, and that repeatedly, so that the rays have four or six whorls of flowers, as in the *H. tribotrys* of Ruiz and Pavon.

2. BOWLESIA. *Ruiz et Pav.*

1. Bowlesia *geraniifolia;* stellato-pubescens, caule procumbente gracili, foliis longe petiolatis reniformibus profunde quinquelobis, lobis ovatis obtusis bi-trifidis sinubus obtusis, pedunculis brevissimis trifloris, fructibus parvis.

B. geraniifolia. *Cham. et Schlecht. in Linn. v.* 1. *p.* 382.

Hab. In regno Chilensi ad Talcaquano primum detexit *Cl. Chamisso.* In umbrosis prope Buenos Ayres. *Gillies.*

Stipulæ majusculæ, albæ, scariosæ, ad basin foliorum.

The *Bowlesia lobata* of Ruiz and Pavon differs from this in the shorter lobes of its leaves, which are undivided, in the acute sinuses, in the greater length of its peduncle and much larger size of the fruit. *Stems* procumbent.—Schlechtendal and Chamisso say the stem is erect, and yet "*cubitalis,*

flaccidus." The species has a very extended range, if I am correct in supposing it to be the plant of Chamisso.

2. Bowlesia *tropæolifolia*, (*Gill. et Hook.*); stellatim pubescens, caule procumbente gracili, foliis palmatim 5–7-partitis, laciniis lanceolatis obtusiusculis integerrimis sinubus acutis, pedunculis subelongatis 3-floris, fructibus parvis.

HAB. In umbrosis et in fissuris rupium apud "el Salto de San Isidro," in convalle Andium versus Mendozam: alt. 6000 ped. *Gillies.*

Tota planta, sed folia juniora pedicellique præcipue, pilis brevibus ramosis stellatisve pubescens. *Caules* filiformes, longi, graciles, procumbentes. *Folia* sublonge petiolata, (petiolo 2 ad 4 uncias longo,) unciam ad duas uncias lata, reniformi-rotundata, profunde ultra medium 5–7-fidis, etiam palmato-partitis, sinubus acutis, lateralibus minus profundis, unde folium fere palmato-pedatum. Ad basin petioli *stipulæ* parvæ, vix, nisi oculo armato, conspicuæ, acuminatæ, albidæ, scariosæ, atque pilosæ. *Pedunculus* subpollicaris, triflorus. *Flores* pedicellati. *Germen petalaque* pilosa.

Subtrib. II. MULINEÆ. *DC.*

3. BOLAX.

1. Bolax *Gilliesii;* densissime cæspitosa, foliis petiolatis trifidis, umbella pedunculata 4–10 flora, fructibus utriculosis. (TAB. LXIII.)

HAB. In valle *Uspallata*, Andibus Mendozæ, alt. 6000 usque ad 12,000 ped. *Gillies.*

Radix longe descendens. *Caules* plurimi ex eadem radice, densissime et latissime cæspitosi, vix duas uncias longi, ubique foliosi. *Folia* siccitate rigida, opaca, basi lato-vaginata, concava, medio in petiolum brevem crassiusculum attenuata, superne dilatata in laminam latiusculam crassam trifidam, laciniis acutiusculis subæqualibus, raro bifidam laciniis æqualibus. *Pedunculus* terminalis, crassiusculus, teres, subrugulosus, superne paululum incrassatus, involucratus. *Involucrum* e foliolis 5–6 ovalibus, concavis, obtusis.

Pedicelli erecto-patentes. *Calyx* e dentibus 5, parvis. *Fructus* elliptico-ovatus, basi apiceque obtusus, transversim sectus, obtuse subtetragonus, insigniter inflatus. *Carpella* subsemiteretia. *Epicarpium* laxum, membranaceum, ecostatum. *Endocarpium* semini arcte adherens, costis vel jugis filiformibus, fuscis, subæquidistantibus, duobus lateralibus marginalibus. *Axis* gracillimus, vix distinctus.

I place this in the genus *Bolax* with much hesitation. The species indeed have been hitherto very imperfectly described, and De Candolle, in his Mémoires sur les Ombelliféres, has limited them to the single *B. glebaria* of Gaudichaud, (*Ann. des Sciences Nat. v.* 5. *p.* 104. *t.* 3. *f.* II.) the *Hydrocotyle gummifera* of Lamarck; and indeed the habit of the two plants, and the general form of their leaves are very similar; so that, were it not for the sessile umbel in Gaudichaud's figure, and the different structure of fruit, I should consider them to be the same species. The fruit there approaches nearly to that of *Mulinum*, having four compressed angles, almost wings; the jugi or *ridges* very distinct; and the epicarp closely united to the rest of the fruit. In our plant the ridges are of a brown colour, and appear to me to be filled with a resinous fluid; so that I should have taken them for *vittæ*, were it not for their situation.

Our present species yields abundantly a gummy or resinous substance, which is gathered by the natives, and employed in the cure of the headach. A similar resin exudes from the *B. glebaria* of Gaud. and probably from several others of this tribe. The long woody roots constitute the only fuel of travellers and herdsmen who frequent the elevated regions inhabited by this plant. The *Fragosa aretioides* of Humb. et Kunth. Nov. Gen. t. 424, will rank near to this; if we may judge from its habit and the fruit being, at least externally, without ridges.

Tab. LXIII. *Fig.* 1, Plant:—*nat. size.* *Fig.* 2, 3, Leaves. *Fig.* 4, Umbel. *Fig.* 5, Fruit. *Fig.* 6, Carpel seen from within. *Fig.* 7, Section of the fruit:—all but *fig.* 1 more or less *magnified.*

4. MULINUM. *Pers.*

Cal. margo quinquedentatus. *Pet.* ovata, integra, acuta, apice inflexa, intus medio linea longitudinali elevato. *Fructus* ovatus, vel subrotundus, quadri-alatus, ad raphin valde contractus, a dorso compressus, concavus. *Carpella* ininsigniter compressa, intus convexa, extus subconcava, jugis 5, filiformibus, duobus intermediis ad angulum carpelli, duobus lateralibus plano commissurali impositis, evittata. *Semen* antice convexum, postice concavum.—Umbellæ *simplices, sessiles vel subpedunculatæ.* Folia (*an semper?*) 3–5-*partita, basi vaginantia, amplexicaulia.*

1. Mulinum *spinosum*; foliis trifidis laciniis subulatis spinosis lateralibus bipartitis umbella pedunculata longioribus, fructibus orbicularibus.

Mulinum spinosum. *Pers. Syn. Pl. v.* 1. *p.* 309.

Selinum spinosum. *Cav. Ic. v.* 5. *p.* 59. *t.* 487. *f.* 1.

Bolax spinosus. *Spreng. in Roem. et Schult. Syst. Veget. v.* 6. *p.* 362.

Fragosa spinosa. *Ruiz et Pav. Fl. Per. v.* 3. *p.* 27?

Hab. Inter los "Ojos de Agua, et El Rio de los Ojos de Agua," in Andibus Chilensibus, et prope Villavicenzio. Alt. 5500 ad 7000 ped. *Gillies.*

Besides the different structure of leaf, which appears a constant character, the fruit is much larger here than in either of the two following species.

2. Mulinum *proliferum*; foliis trifidis laciniis subulatis spinosis, umbella pedunculata terminali lateralique folium æquante, fructibus orbicularibus.

Mulinum proliferum. *Pers. Syn. Pl. v.* 1. *p.* 309.

Selinum proliferum. *Cav. Ic. v.* 5. *p.* 58. *t.* 486. *f.* 1.

Bolax prolifera. *Spreng. in Roem. et Schult. Syst. Veget. v.* 6. *p.* 361.

Hab. Frequens in Andibus Mendozæ, inter San Isidro et

Porlezuela, in declivitatibus montium. Alt. 5000 ad 10,000 ped. *Gillies.*

This is a very variable plant, especially in the length of its leaves, and in the umbels being solitary and terminal upon a branch, or with lateral ones: all about equal in length with the leaves. This and the preceding are called *Dichillo* in the country where they grow. I find no umbels proliferous, as in Cavanilles' figure: but in other respects the plants entirely accord.—Near Uspallata, Dr. Gillies found a variety with purplish flowers.

3. Mulinum *ulicinum*, (*Gill. et Hook.*); foliis trifidiis laciniis subulatis spinosis, umbella subsessili in ramulis brevibus terminali, fructibus ellipticis. (Tab. LXIV.)

Hab. Prope "La Cienega de Bonillo," in summum fere jugum montium Uspalatensium. Alt. 9500 ped. *Gillies.*

Frutex humilis, odorifera, omnino glabra, valde ramosa, ramis primariis subdigitalibus, flexuosis, rigidis, valde intricatis, secundariis brevissimis, lateralibus numerosis, ubique dense foliosis. *Folia* vix uncium longa, rigidissima, basi vaginantia, amplexicaulia, utrinque, statu juniori, unisetosa, demum linearia, ad apicem in laciniis tribus brevibus, divaricatis, subulatis, spinosis desinentia. *Umbellæ* terminales ex apicibus ramulorum lateralium, solitariæ, fere omnino sessiles. *Involucrum* e foliolis lineari-subulatis, subsex, basi in tubum brevem connatis. *Pedicelli* 6–8. *Flores* plurimi abortientes. *Calyx* e dentibus 5, minutis. *Petala* ovata, intus medio linea longitudinali elevata notata, apice acuto incurvo. *Fructus* ellipticus, compresso-tetragonus, fere quadri-alatus.

Tab. LXIV. *Fig.* 1, Plant:—*nat. size.* *Fig.* 2, Leaf. *Fig.* 3, Portion of an umbel. *Fig.* 4, Petal. *Fig.* 5, Fruit. *Fig.* 6, Carpel, seen on its inner face. *Fig.* 7, Section of the entire fruit:—all but *fig.* 1 more or less *magnified.*

4. Mulinum *albovaginatum*, (*Gill. et Hook.*); foliis trifidis

laciniis ovato-lanceolatis mucronatis, umbella axillari parviflora sessili.

HAB. Apud "Cerro de la Polcura," in Andibus versus Mendozam. *Gillies.*

Of this very distinct species there are few and very indifferent specimens in Dr. Gillies' collection, and the root and lower part of the stems are altogether wanting. Those that exist are branched in a dichotomous manner, the branches clothed with the long, white, shining, membranaceous sheaths to the leaves. The leaves themselves are sometimes slightly hairy: the segments of the leaves greatly broader and less rigid than in the preceding species. Fruit as in *M. ulicinum.*

In the branches and leaves this species has much similarity to the *Selinum microphyllum* of Cav. Ic. tab. 486, but in that plant the umbels are borne upon comparatively long terminal peduncles.

5. LARETIA. *Gill. et Hook.*

Cal. margo 5-dentatus. *Pet.* ovata, integra (*fide Cavan.*) *Fructus* elliptico-quadratus, a dorso plano-compressus, quadrialatus. *Carpella* lenticularia, jugis 5 dorsalibus, 2 lateralibus marginalibus, evittata. *Semen* complanatum.—Umbellæ *sessiles, involucratæ.* Planta *fere acaulis dense cæspitosa.* Folia *integra.*

1. Laretia *acaulis,* (*Gill. et Hook.*) (TAB. LXV.)

Selinum acaule. *Cav. Ic. v.* 5. *t.* 487. *f.* 2.

Mulinum acaule. *Pers. Syn. Pl. v.* 1. *p.* 309.

HAB. In Andibus Chilensibus, ad vallem *del Fray Carlos,* prope radices montium ignivomarum "*Peteroa,*" et "*Penquenes.*" Alt. 10,000 ad 11,000 ped. *Gillies.* Nom. vernac. *Llareta.*

Radix crassiuscula, lignosa, subfusiformis, longe descendens, hic illic fibrosa. *Caules* brevissimi, fere nulli, densissime cæspitosi, apud terram declinati. *Folia* numerosa, in rosulas expansa, oblongo-lingulata, inferne attenuata, basi vaginato-amplexicaulia. *Umbella* terminalis, pauciflora, sessilis, involucro polyphyllo, e foliolis ovato-lanceolatis

parvis, cincta. *Fructus* pro plantæ magnitudine maximus, compresso-membranaceus.

It is remarkable that this singular plant, which often covers the ground in patches of many feet in diameter, yet scarcely rising above the surface of the soil, and which yields a resin applied to the same purposes as that of *Bolax Gilliesii*, should not have been noticed by any author since Cavanilles described and figured it, from specimens found at Port Desire on the coast of Patagonia. Persoon, indeed, refers it to *Mulinum*, under the persuasion that all the South American *Selina* of Cavanilles belong to one and the same genus; and Professor De Candolle, in saying * that Cavanilles has well described *four* species of *Mulinum*, evidently intends to include our plant in that genus. But in all probability these authors had never seen its fruit, which certainly comes near the old genus *Selinum* in the singular situation of the ridges, all of which are placed upon the flattened extérior surface of the carpel. The accurate Cavanilles omitted to notice the marginal ridges and the central one, and thus described each carpel as having only two ridges. A representation of the fruit is given at

Tab. LXV. *Fig.* 1, Plant in fruit:—*nat. size.* *Fig.* 2, Fruit. *Fig.* 3, Transverse section of the fruit.

6. POZOA. *Lagasca.*

Calyx margo 5-dentatus. *Petala* ovata, integra, linea media elevata. *Fructus* oblongus, obtuse tetragonus, ad raphin contractus, dorso insigniter canaliculato. *Carpella* antice semi-teretes, dorso canaliculata, angulis obtusis, quinquejugata, jugis duobus lateralibus plano commissurali impositis, evittata. *Semen* antice convexum, postice concavum seu canaliculatum.—Umbella *simplex.* Involucrum *monophyllum, amplum, margine dentatum, nervosum.* Scapus *radicalis.* Folia *integra, coriacea.*

1. Pozoa *coriacea.* (Tab. LXVI.)

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* Mémoires sur les Ombellifères, p. 30.

P. coriacea. *Lagasca, Gen. et Sp. nov. Diagn. p.* 13. *n.* 163.

Hab. Santa Madre, Ceno del Polcina, Los Impossibles et aliis locis Andium Chilensium, intra Mendozam et Chile, alt. 9000 ad 10,000 ped. *Gillies.*

Radix longe descendens, crassiuscula, sublignosa, perennis. *Folia* omnia radicalia, longe petiolata, glaberrima, rotundata, etiam subcordata, frequenter subcuneata, radiatim nervosa, coriacea, glauco-viridia, margine superiore præcipue crenato-dentata; petiolo gracili non raro purpurascente, basi vaginato, vagina brevi. *Scapi* radicales omnino aphylli, primum foliis breviores, demum valde elongati, spithamæi. *Umbella* terminalis, solitaria, involucro amplo, monophyllo, hemisphærico, membranaceo, dentato, venoso, inferne cincta. *Pedicelli* numerosi. *Flores* in capitulum hemisphæricum congesti, plurimi abortivi. *Calyx* e dentibus majusculis 5, persistentibus. *Petala* 5, erecto-patentia, concava, integra, acutiuscula, vix apice incurva, intus linea media longitudinali elevata. *Fructus* oblongus, prismatico-tetragonus, angulis obtusis.

I am not aware that any figure exists of this singular and very beautiful genus of *Umbelliferous* plants; and indeed so rare is the work above referred to, in which its name and character are published, that I have not been able to refer to it, and I rely upon Roemer and Schultes for the correctness of the synonym. The size of the plant is liable to great variation, and still more is the form of its leaves, for though the greater number of them are cuneate at the base, others are almost exactly cordate. The general colour is a pale glaucous green, but some specimens are beautifully tinged with purple, especially in their petioles.

Tab. LXVI. *Fig.* 1, Fertile flower. *Fig.* 2, Fruit. *Fig.* 3, Section of a carpel:—*magnified.*

7. ASTERISCIUM. *Cham. et Schlecht.*

Cal. margo dentibus 5, majusculis. *Petala* intus medio linea longitudinali, apice incurva, dorso tuberculo carnoso.

Fructus oblongus, prismatico-tetragonus, 4-alatus, ad raphin contractus, a dorso compressus. *Carpella* planiuscula, antice subconvexa, dorso subcanaliculata, quinquejugata, jugis 2 lateralibus plano commissurali impositis, evittata.—Umbella *simplex, subglobosa.* Involucrum *polyphyllum, breve.* Plantæ *rigidæ, foliis simplicibus, caulibus paniculatis.*

1. Asteriscium *chilense;* foliis trilobis inciso-serratis, pedunculis elongatis sparsis, petalis profunde emarginatis apicibus longissimis involutis, fructu basi angustiore, involucri foliolis lanceolatis incisis. (Tab. LXVII. A.)

A. chilense. *Cham. et Schlecht. in Linn. v.* 1. *p.* 254. *t.* 5. *f.* 1. (fructus.)

Hab. Apud La Cuesta de Zapata, in Chile, alt. 1600 ped. *Gillies.*

So accurately have Chamisso and Schlechtendal described the present plant, that nothing is left for me but to form a character which shall distinguish it from the following species.

Tab. LXVII. A. *Fig. a,* Head of flowers: *nat. size. Fig.* 1, Abortive flowers. *Fig.* 2, The same, from which the petals and stamens are removed. *Fig.* 3, Perfect flower. *Fig.* 4, Back view of a petal. *Fig.* 5, Front view of do. *Fig.* 6, Front view of do., the curiously involute apex being removed. *Fig.* 7, The apex. *Fig.* 8, Transverse section of the fruit:—*magnified.*

2. Asteriscium *polycephalum,* (*Gill. et Hook.*); aphyllum? pedunculis corymbosis numerosis, nunc abortivis spinosis, petalis integris acutis apice involutis, fructu lato-oblongo, involucri foliolis linearibus integris. (Tab. LXVII. B.)

Hab. In convallibus Andium, prope "Ladera de la Jaula," et versus "Uspallata," in provincia Mendoza, alt. 7500 ped. *Gillies.*

The specimens of this plant are gathered at some distance above the root, and are evidently in an advanced state of fructification, while the absence of leaves, for none exist upon

any of the specimens, may be accounted for by these two circumstances. There are scars at the base of each peduncle, but whether bracteæ or leaves have fallen away, I am uncertain. Many heads of flowers remain, but they are all barren; yet, from these and from the perfect fruit, (that most important organ in the classification of *Umbelliferous* plants,) there cannot be a question of its belonging to the same genus as the preceding. The stem is glaucous, striated, rounded, rough to the touch between the striæ. Some of the lower branches are spinous, and appear to be abortive peduncles. Barren *flowers* with large calycine teeth, and *petals* which have a much less distinct tubercle than those of *A. chilense*, quite entire, with a comparatively short acute incurved point. *Fruit* larger, broader in proportion to its length, more brown, shining, and membranaceous than the preceding, yet in general structure it is the same.

In another part of Dr. Gillies's Chilian Collection is a solitary specimen of a plant, which, different as it may appear in habit from those now under review, I am yet inclined to consider the *young* state of the same species; in it there are many radical and several remote cauline *leaves*, petiolated, cordate, 3-lobed, waved at the margin, and spinuloso-dentate. The *umbels* are compound, scarcely reaching above the leaves, and they probably run out into a corymbose *panicle* in age. There are barren flowers mixed with the perfect ones, and their structure is very similar to those of our *A. polycephalum*. I should observe, however, that this plant was found by Dr. Gillies, not in Chile, but in the valley through which the river Salado runs, and near where it issues from the mountains at the southern extremity of the province of Mendoza.

Tab. LXVII. B. *Fig.* 1, Head of barren flowers: *nat. size*. *Fig.* 2, Single barren flower. *Fig.* 3, Back view of a petal. *Fig.* 4, Front view of do. *Fig.* 5, Head or umbel of fruit:—*nat. size*. *Fig.* 6, Fruit. *Fig.* 7, Transverse section of the same. *Fig.* 8, One of the carpels, still suspended by its bifid axis; the others having fallen away:—all but *figs.* 1 and 5 *magnified*.

8. ERYNGIUM. *Linn.*

* *Nervis foliorum parallelis.*

1. Eryngium *aquaticum;* foliis lineari-lanceolatis remote ciliato-spinosis, inferioribus ensiformibus, floralibus lanceolatis dentatis, involucri foliolis capitulo globoso brevioribus paleisque integris, caule subdichotomo. *Spr.*

E. aquaticum. *Linn. Sp. Pl. p.* 336. *Jacq. Ic. Rar. v.* 2. *t.* 347. *Delaroche, Eryng. p.* 57.

E. yuccæfolium. *Mich. Fl. Bor. Am. v.* 1. *p.* 164.

Hab. Locis humidis ad ripas Fluminis *Chuelo,* prope Buenos Ayres. *Gillies.*

2. Eryngium *paniculatum;* foliis linearibus dentato-spinosis, floralibus brevissimis ovalibus, involucri foliolis paleas æquantibus, caule dichotomo. *Delaroche.*

E. paniculatum. *Delaroche, Eryng. p.* 59. *t.* 26.

Hab. In Chile: prope *La Guardia de Potrero* in valle fluminis *Maypu;* et in Provincia Sancti Ludovici, ad summum fere jugum montium "*Cerro del Morro.*" *Gillies.*

3. Eryngium *nudum,* (*Gill. et Hook.*)*;* caule elato paniculato, foliis lineari-subulatis canaliculatis ciliato-spinosis, spinulis bi-ternisve, capitulis globosis, involucris nullis.

Hab. In planitie "*Pampas*" dictam, circa Buenos Ayres. *Gillies.*

Caulis erectus, 4–5 pedalis, erectus, teres, striatus, gracilis, superne laxe paniculatus, ramis verticillatis ternatisque. *Folia inferiora* longiora, pedalia; *superiora* sensim minora, lineari-subulata, striata, glauco-viridia, basi latiora, caulem amplectentia; *suprema floraliaque* minuta, subulata, margine ciliato-spinosa; spinulis binis ternisve basi incrassatis, versus apicem foliorum rarioribus. *Capitula* pedunculos longos graciles terminantia, involucro omnino destituta. *Flores* densissime compacti. *Paleæ* oblongæ, florem æquantes, acutæ, mucronatæ. *Calycis* foliola erecta, magna, elliptica, mucrone recto terminata. *Petala*

oblonga, erecta, acumine petali longitudine arctissime inflexo, calycem vix excedentia. *Styli* longe exserti, filiformes, erecti. *Germen* setis paleaceis appressis aculeatum.

The present species is allied to *E. ebracteatum* of Lamarck, and Delaroche, *Eryng. t.* 32, in habit, and especially in the *capitula* being destitute of *involucre;* but it differs in the abundant *spinules* upon its *leaves,* the globose, not oblong, head of *flowers,* and the mucronated calycine segments.

* * *Nervis foliorum ramosis.*

4. Eryngium *nudicaule ;* foliis radicalibus obovatis in petiolum attenuatis grosse spinoso-serratis, serraturis iterum spinulosis, caule dichotomo subaphyllo, involucris lanceolatis spinosis capitula rotunda æquantibus, paleis subulatis.

E. nudicaule. *Lam. Encycl. v.* 4. *p.* 759. *t.* 187. *f.* 2. (*male.*) *Delaroche Eryng. p.* 51.

Hab. In provincia Sancti Ludovici, in summum fere jugum montium "*Cerro del Morro.*" Alt. 4500 ped. *Gillies.*

Delaroche's description is made from specimens gathered at Monte Video by Commerson. They quite agree with the individuals in Dr. Gillies's herbarium; but the figure in Lamarck's Cyclop. is a very indifferent one, it must be confessed.

The other *Umbelliferous* plants in Dr. Gillies's collection are the following; and they are probably introduced from Europe. 1. Apium *graveolens. Linn.* Mendoza and Cordova.—2. Petroselinum *sativum. Hoffm.* Mendoza.—3. Helosciadium *lateriflorum. Koch.* Buenos Ayres.—4. Ammi *Visnaga. Lam.* α. major. Maritime provinces of Chili. β. minor. River *Saladillo,* in Cordova.—5. Fœniculum *vulgare. Gærtn.* Mendoza and Buenos Ayres.—6. Daucus *Carota. Linn.* Mendoza.—7. Myrrhis *odorata. Scop.* Vallies of the Andes of Chili and of Mendoza.—8. Coriandrum *sativum. Linn.* Pampas of Buenos Ayres.

OBSERVATIONS ON SOME BRITISH PLANTS, PARTICULARLY WITH REFERENCE TO THE ENGLISH FLORA OF SIR JAMES E. SMITH.—By W. Wilson, Esq.

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1. Salicornia *herbacea.*—Near Holyhead, Aug. 22, 1828.—The central *flower* (of each cluster of three) is diandrous, one *anther* below, and the other above the laterally compressed *germen:* lateral *flowers* with only one *stamen,* above the pistil. *Calyx* with three rounded entire shallow segments; one *anther* partly protruded. Rudiment of the *seed* compressed, rounded, rough-edged, the *funiculus* attached to the base of the germen. The joints beneath the flowers have the appearance of connate leaves. It appears that all the British species of this genus are diandrous.

2. Chara. (Example *C. gracilis;* Llyn Idwel, May 30, 1828.)—*Anther* with 8 sides, splitting into as many portions, and from the centre of each, internally, proceeds a *footstalk,* supporting at its extremity a number of fibres, (*pollen?*) which are transversely marked with dark lines. *Germen* with 5 spiral *striæ,* meeting at the summit and forming the *stigma?* which, in this species, is very minute, and not toothed. *Seeds?* pellucid, contained within an internal, roundish membrane.

Chara gracilis has the whorled branches forked, or trifid, especially in the female. *Pistils?* two together at the forks, sessile. *Anthers* on a separate plant, mostly solitary, in similar situations; two colourless lines are seen on opposite sides of the stem and branches. This plant is diœcious in the above situation, (observed during three years;) the fertile plant twice as tall; the yellow hue of the barren plant (arising from the large anthers) readily distinguishes it from the other, when seen growing at the bottom of the lake: they grow in company, and are much intermixed.

3. Chara *aspera.*—Near Holyhead, July, 1828.—The *stem* is not striated or furrowed, as in *C. hispida,* nor are the whorled branches very evidently jointed. *Anthers,* as above

described in *C. gracilis* (with respect to their structure); the point of insertion is surrounded by a whorl of 5 *bracteas?* two of which are placed beneath the anther.

4. Callitriche *verna.*—This is *sometimes found without floating leaves,* in which state it may have been mistaken for *C. autumnalis.* In *C. verna* the lower *leaves* are linear, abrupt, or erose, single-ribbed. *Fruit* emarginate, nearly round and compressed, consisting of 4 semicircular flat *seeds.*

5. Callitriche *autumnalis.*—Llyn Macloy, Anglesea, July, 1825 and 1828.—*Flowers* separated, two barren and two fertile ones neighbours, but not always so. I cannot find any petals. *Styles* very long, deflexed. *Leaves* not quite linear, but rather broader at the base, also abrupt and single-ribbed; they are always broader than in *C. verna. Fruit* orbicular, compressed, with a membranous margin. It is twice the size of that of *C. verna;* the seeds are thinner and more closely applied to each other. I believe that *petals* are never present in this species. I have never seen this plant growing near the surface of the water.

6. Circæa *alpina.*—Perthshire, July, 1827.—The *Calyx* is certainly elevated above the germen, but is *not tubular.* I think the part mistaken for a tubular portion of the calyx is only a sort of beak to the fruit, and in that case the calyx must be two-leaved. *Filaments* not very evidently thickened upwards. *Style* reddish, but not the petals or filaments. *Stigma* a double globe.

7. Utricularia *vulgaris.*—July, 1828.—The *bladders* upon the *leaves have an orifice closed by an elastic valve, opening inwards,* and of much thinner texture than the bladder to which it is attached where the crest is placed. The crest usually consists of two short branched filaments; the valve is sometimes bearded; insects often enter the bladders, and are of course confined there. *Anthers* of one cell; *filaments* much bent, thick, and somewhat compressed. *Stigma* two-lipped, the largest membranous and fringed (placed nearest to the anthers.) Lower *calyx*-leaf notched, and rather larger than the other.

8. Lemna *minor.*—Anglesea, September 3, 1828.—*Corolla* monophyllous, roundish, closely investing the stamens and pistils. *Stamens* two, rarely exserted at the same time. *Pollen* globular, its diameter to the breadth of the stigma as 1 to 8. *Germen* with a solitary rudiment. *Style* curved upwards. *Stigma* two-lipped, and more dilated than in *L. gibba.* *Seed* transversely placed within the capsule, (the *hilum* pointing toward the narrow end of the frond,) compressed, obscurely furrowed at the sides. *Frond* elliptical, more oblong than in *L. gibba.* *Root* a single fibre, tipped with a long sheath, which is sometimes minutely hairy. The *albumen* is more distinct in this seed than in that of *L. gibba.* *Embryo* as in that species, though smaller.—I believe the frond, as well as that of *L. gibba* to be always laterally proliferous, whether the flower be present or not, the "buds" not supplying their place, but accompanying them.

9. Lemna *gibba.*—Near Warrington, September, 1826.—Grains of *Pollen* globular, their diameter to the thickness of the anther as 1 to 7, and to the breadth of the stigma as 1 to 5; they do not burst in water until after having been dried. Only one *stamen* exserted. *Style* the length of the germen. *Stigma* two-lipped, concave. *Capsule* rounded, compressed, pointed with the base of the style, four-seeded. *Seed not* transversely placed, but with the *hilum* towards the top of the capsule, furrowed. I have never seen two *flowers* on the same frond. The *root* proceeds from a part which is free from the vesicular gibbous body underneath; these vesicles are filled with air until the plant decays.—In the same situation fertile specimens were plentiful in September, 1827.

10. Cladium *Mariscus.*—Cheshire, August, 1825.—*Stigmas* generally two, which are sometimes cloven. Three *flowers* not unfrequent in each spikelet, but more commonly two only are found, one of which is usually abortive, yet it is not difficult to find instances in which both come to perfection, and sometimes even the third floret is fertile. *Vide Engl. Fl. vol.* 4. *Addenda.*

11. Anthoxanthum *odoratum.*—June, 1828.—I think Mr.

Brown correct in his view of this genus. It is difficult to suppose that part to be the nectary which is so termed in *Engl. Fl.*; it *contains*, not merely *surrounds*, the germen, and is elevated by a short stalk above the (so termed) corolla, and consequently above the germen and the receptacle of the flower. The larger *awn* is inserted near the base of the glume, opposite the larger valve of the calyx, as also the larger valve of the "nectary." *Germen* spurred below.—No appearance of nectaries, such as are usually found in grasses.

12. Valeriana *dioica*.—May 19th, 1827.—The plant is furnished with horizontal shoots, but I do not think the *root* a creeping one. *Fertile flowers* much smaller than the others. *Stigma*, in the really fertile flowers, deeply three-cleft; when *stamens* occur on the fertile plant, they are short, abortive, and enclosed within the tube of the corolla. *Style* deciduous. *Stem* with four winged angles.

13. Schœnus *nigricans*.—June, 1826.—*Leaves* semi-cylindrical, with roughish edges, shorter than the stem. The "*scales* at the base of the *germen*" appear to me more like short spiny bristles, 5 or 6 in number, attached, as Smith observes, to the receptacle, but certainly placed on the outside of the filaments; which is the case also in various species of *Scirpus*, and, as I am inclined to believe, in all instances where bristles are formed at all.

(To be continued.)

[TAB. LXVII. LXVIII.]

DESCRIPTION OF A NEW SPECIES OF MACROPODIUM,

Found by Mr. David Douglas *in North West America.*

The genus *Macropodium* was established in the 4th vol. of the 2d edition of the *Hortus Kewensis*, upon the *Cardamine nivalis* of Pallas, by our illustrious countryman Mr. Brown, and thus characterised—"*Siliqua* pedicellata, linearis. *Coty-*

ledones accumbentes. *Calyx* erectus." Hitherto, however, only one species has been known to Botanists, and that is an inhabitant of the Altaic Mountains, near the limits of perpetual snow; and has a habit so unlike the *Cruciferous* plants in general, that Vahl, in his herbarium, as we are assured by De Candolle, marked it as a *Cleome*. Of this, the *Macropodium nivale* of Brown, I am not aware that any figure exists, except the one published in Pallas' Travels, a work probably in the hands of few Botanists, and where it is not to be expected that the analysis of the fructification is exhibited with the precision that will be satisfactory to those who adopt the new arrangement of the still difficult and most extensive family of plants to which this genus belongs. On this account, and because I possess no perfect fruit of the new species, I shall render my account of this genus more complete by representing that of *M. nivale*.

GEN. CHAR. *Cal.* erectus, basi latiore. *Petala* calyce multo longiora, linearia vel lineari-spathulata. *Stamina* libera. *Antheræ* lineares, vel oblongæ. *Stylus* subnullus. *Stigma* parvum, capitatum. *Siliqua* stipitata, lineari-ensiformis, compresso-plana, pedicellata: valvis planis, obscure reticulatis, medio uninerviis. *Semina* suborbicularia, compressa, uniseralia, vix, nisi in statu juniore, marginata. *Cotyledones* accumbentes.—Radix *annuus vel perennis.* Caulis *herbaceus, simplex vel ramosus.* Folia *integra vel laciniata.* Racemus *terminalis, longus, multiflorus.* Flores *albi.*

1. Macropodium *nivale;* foliis lanceolatis caulinis sessilibus integerrimis, radicalibus longe petiolatis obscure serratis, floribus sessilibus, petalis lineari-spathulatis. (TAB. LXVII.)

M. nivale. *Br. in Hort. Kew, ed.* 2. *v.* 4. *p.* 108. *De Cand. Prodr. v.* 1. *p.* 149.

Cardamine nivalis. "*Pall. It.* 2. *Append. v.* 113. *t.* U." *Willd. Sp. Pl. v.* 3. *p.* 482.

Arabis nivalis. *Spreng. Syst. Veget. v.* 2. *p.* 893.

HAB. In alpibus Altaicis, unde recepi ab amicissimis. *Ledebour, Fischer, Prescott.*

Radix perennis, subfusiformis, crassa, lignosa, hic illic fibris ramosis instructa. *Caulis* erectus, simplex, spithamæus ad pedalem et ultra, teres, glaber, foliosus. *Folia* omnia lanceolata, glabra, basi apiceque attenuata; *caulina* sessilia, integerrima; *radicalia* longe petiolata, subserrata. *Racemus* (vel *spica*) terminalis, elongatus, simplex, multiflorus. *Flores* fere omnino sessiles, albi. *Petala* calyce subduplo longiora, linearia, apice dilatata, venosa. *Antheræ* oblongæ, siccitate curvatæ. *Germen* lineari-oblongum, teres, sublonge pedicellatum, pedicello hirsuto. *Stigma* fere sessile, parvum, capitatum. *Siliquæ* pendulæ, lineari-ensiformes, duas uncias longæ, duas lineas latæ, stipite gracili duas tres lineas longo suffulta. *Valvæ* planæ, membranaceæ, subtorulosæ. *Semina*, singulo loculo 6–8, transversim inserta, vel apice ad basin siliquæ versa, orbiculari-compressa, fusca, (vix matura) submarginata, (matura) immarginata. *Embryo* flavus.

It is singular that Sprengel should have placed this plant in the genus *Arabis*, notwithstanding that its habit is widely different, and that it has been so admirably defined as to genus by Mr. Brown.

Tab. LXVII. *Fig.* 1, Flower. *Fig.* 2, Petal. *Fig.* 3, Pistil. *Fig.* 4, Stamen. *Fig.* 5, Fruit. *Fig.* 6, Siliqua with the valves separating. *Fig.* 7, Seed. *Fig.* 8, Section of do. *Fig.* 9, Embryo:—all but *fig.* 5, *magnified.*

2. Macropodium *laciniatum;* foliis omnibus petiolatis laciniato-pinnatifidis, floribus pedicellatis, petalis angustis linearibus. (Tab. LXVIII.)

M. laciniatum. *Hook. Fl. Bor. Am.. v.* 1. *p.* 43.

Hab. In rupibus siccis apud "*Wallawallah,*" et "*Priest's Rapid,*" fluminis "*Columbia,*" Americæ septentrionalis. *D. Douglas.*

Radix annua. *Caulis* erectus, herbaceus, teres, valde ramosus, ut et tota planta, glaberrimus, duas ad quinque pedes altus, foliosus. *Folia* omnia petiolata, circumscriptione lanceolata, vel ovato-lanceolata, profunde pinnatifida,

basin versus præcipue, ubi laciniis remotis horizontalibus, integris vel dentatis, superne subangulato-dentata, laciniis brevibus, valde inæqualibus. *Folia* suprema marginibus sinuato-dentatis. *Racemus* terminalis, elongatus, palmaris ad spithamæum, erectus, multiflorus. *Flores* pedicellati. *Pedicelli* graciles, duas tres lineas longi. *Calyx* e foliolis erectis, oblongis, obtusis, basi paululum dilatatis. *Petala* linearia, calyce triplo longiora, flexuosa, et sæpe recurvata, apice integra, nunc bi-tridentata, alba. *Stamina: Filamenta* libera, edentula: *Antheræ* lineares, dorso, paulo supra basin, affixæ. *Pistillum: Germen* lineare, superne attenuatum, basi pedicellatum, stipite gracili glaberrimo. *Stigma* obtusum, integrum, parvum, subsessile.

In the long spiked *raceme* and the general structure of the *flowers*, this has a very close affinity with the preceding species; but there the affinity ceases: for, even in the inflorescence, when it comes to be minutely examined, a very marked difference will be discovered. In *M. nivale*, the *petals* are spoon-shaped, scarcely more than twice the length of the calyx; the *anthers* are oblong, the *germen* thick (comparatively) and almost cylindrical, its *pedicel* or *stipes* hairy, and there is only a sort of tubercle, scarcely to be called a footstalk, which supports the flower. In *M. laciniatum* there is a distinct footstalk to the flower; the *petals* are linear, thrice as long as the calyx; the *anthers* are linear; the *germen* is linear-filiform, attenuated, and placed upon a *glabrous stipes* or *pedicel*.—I regret that there is no *fruit* upon the specimens found by Mr. Douglas. Judging from the more advanced pistils, it would be much longer than that of *M. nivale*.

M. laciniatum has been found by none of our American travellers except Mr. Douglas, and only in the spots here mentioned, at the Columbia River.

TAB. LXVIII. *Fig.* 1, Flowering summit of a plant. *Fig.* 2, Stem-leaf:—*nat. size.* *Fig.* 3, Flower. *Fig.* 4, Stamens. *Fig.* 5, Pistil. *Fig.* 6, The same, in a more advanced state:—*magnified.*

[TAB. LXIX.]

FIGURE AND DESCRIPTION OF A NEW SPECIES OF CARDAMINE, FROM NORTH WEST AMERICA.

CARDAMINE ANGULATA.

1. Cardamine *angulata;* foliis omnibus petiolatis ternatis rarius quinato-pinnatis, foliolis angulato-dentatis angulis mucronatis, caulinis ovatis lanceolatisve, radicalibus rotundatis. (TAB. LXIX.)

Cardamine angulata. *Hook. Fl. Bor. Am. v.* 1. *p.* 44.

HAB. Locis humidis ad flumen *Columbia,* in plaga occidentali Americæ Septentrionalis. *Douglas. Scouler.*

Planta tota glaberrima. *Radix* perennis, crassa, longe repens, hic illic fibrosa. *Caulis* erectus, pedalis, etiam bipedalis, erectus, simplex, teres, (siccitate) striatus, herbaceus, nitidus, parce foliosus. *Folia* sublonge petiolata, ternata, rarissime subquinato-pinnata, glaberrima, membranacea: *foliolis radicalium* subrotundis vel cordatis, *caulinorum* ovatis vel lanceolatis inferne attenuatis, omnibus acuminatis, angulatis vel inciso-lobatis, angulis vel lobis dentibusve obtusiusculis cum mucrone brevi molli, lateralibus non raro brevi-petiolatis, alternis vel oppositis, terminali plerumque majore. *Flores* corymbosi, pedunculati, terminales et axillares, majusculi. *Pedicelli* graciles, 3–4 lineas longi, glabri. *Petala* obovata, unguiculata, sepalis plusquam duplo longiora, pallide rosea, iis similia *C. pratensis.*

The present plant will rank next to *C. macrophylla* of Gmelin's Fl. Sibirica, v. 3. t. 62, a native of the Altaic range. But that plant differs from ours in its truly pinnated leaves of from 5–7 leaflets, which are smaller than those of *C. angulata,* and distinctly and with considerable regularity serrated: whereas in our plant there are few and distant large angular teeth or segments. It is a species that seems to be confined to the lower part of the river Columbia.

TAB. LXIX. Plant:—*nat. size.*

[TAB. LXX.]

SOME OBSERVATIONS ON A NORTH AMERICAN PLANT, SUPPOSED TO BE THE LEWISIA OF Mr. PURSH.

In the 2d vol. of Mr. Pursh's *Flora Americæ Septentrionalis*, *p.* 368, that author has given a new plant under the name of *Lewisia rediviva*, and the genus he thus distinguishes: "Cl. and Ord. Polyandria Digynia. *Cal.* 7–9-phyllus, scariosus. *Pet.* 14–18. *Stylus* 3-fidus. *Caps.* 3-locularis, polysperma. *Semina* nitida." I am not aware that authentic specimens of this exist in any Europæan herbarium; and all we know for certain of it, therefore, is from Mr. Pursh's description. It is a plant, he says, "with a fusiform, branched, and blood-coloured *root*, bearing radical, linear, and somewhat fleshy *leaves;* a single or 2-flowered *scape;* the *pedicel* jointed at the base. *Calyx* coloured, scariose, from 7–9-leaved, patent; *leaflets* ovate, acute, concave, the interior ones narrower. *Petals* 14–20. *Filaments* 14–18, shorter than the calyx. *Anthers* erect, oblong. *Style* filiform, trifid above. *Stigmas* 3, bifid. *Capsule* oblong, 3-celled; the *cells* 2-seeded. *Seeds* lenticular, shining, black." He farther observes, that the specimens were so tenacious of life, that roots taken from the herbarium of Mr. Lewis, and planted in a garden at Philadelphia, vegetated and continued to grow for a year; when they appear to have been lost. Pursh did not find the plant growing, but describes it from the herbarium of M. Lewis, Esq. who gathered it on the banks of Clark's River.

Mr. Nuttall does not appear to have seen the plant; for, in his *Genera of North American Plants*, he adopts Pursh's character, and expresses his regret that that author did not give a figure of this very interesting plant.

On Mr. Drummond's return from his arduous travels among the Rocky Mountains, he brought with him some small bags of a dried *root*, white and brittle, which are collected and dried for food by the natives of the western side of the Rocky Mountains, and which they take with them on

their journeys, whence it has become well known to the Canadian hunters, and to the officers of the Hudson's Bay Company. On these roots being shown to Mr. Douglas, he immediately recognised them as belonging to a plant which he had gathered on the banks of some of the tributary streams of the Columbia; and which he considered to be the *Lewisia* of Pursh. His specimens, brought home in the herbarium, having no flower, and showing signs of life, were planted in the garden of the Horticultural Society; but, like those at Philadelphia, they vegetated for a short time, and then perished.

Upon searching carefully among the dried roots collected by Mr. Drummond, many were found to have the *leaves* in a tolerably perfect state, and not a few their *scapes* and *unexpanded flowers;* but much injured in the process of drying, and by having been packed in bags. Some of the best of them were partially recovered by immersion in hot water; and from these the following description and the subjoined figure have been made.

Lewisia *rediviva? β. radice alba.* (Tab. LXX.)

Radix perennis, subfusiformis, descendens, alba, fragilis, ramosa. *Folia* plurima, omnino radicalia, stellatim patentia, duas uncias longa, linearia, carnosa, glabra, subteretia, superne sulcata, apice valde obtusa, intus fasciculo fibrillarum tenui percussa. *Scapi* plurimi ex eadem radice, bi-triunciales, erecti, teretes, glaberrimi, uniflori, sub florem articulati, involucrati; bracteis vel foliolis subulatis, membranaceis. *Flos* inapertus: *Calyx* e foliolis 7, arcte convolutis, submembranaceis. *Corolla* polypetala. *Petala* 9–12, foliolis calycinis subsimilia sed tenuiora, interiora sensim minora. *Stamina* 12–16, erecta, hypogyna. *Filamenta* brevia. *Antheræ* lineares, flavæ, apice breviter apiculatæ. *Pollen* triangulari-subrotundum, e granulis tribus constans. *Pistillum: Germen* globosum, obscure trilobum. *Stylus* sexpartitus, laciniis longis, erectis, filiformibus. *Stigmata* obtusa. *Ovula* plurima, receptaculo centrali libero inserta.

If this character and figure be compared with the description of Mr. Pursh, making allowances for their being all executed from dried specimens, I think it will appear that the two plants in question, if not the same as to species, are in all probability so as to genus, and that they will rank in the Nat. Ord. PORTULACEÆ, very near to TALINUM. Indeed, I have some species of *Talinum*, gathered by Dr. Gillies in the South American Andes, which approach very nearly to this in habit. As a species, the present appears to differ from *L. rediviva* in its rose-coloured flower (Douglas), not white veined with pink; and in its white, not sanguineous roots, which are crisped and brittle.

Mr. Douglas found the plant to be abundant at the junction of the "Spokan River" with the Columbia, in dry stony soils, also on the "Flathead" and "Salmon Rivers," in similar situations.

The roots, Mr. Douglas informs me, are gathered in great quantities by several of the tribes who inhabit the country skirting the subalpine regions of the Rocky Mountains, on the west side, and are known among those who use the language of the Spokan tribes, by the name of *Spatulum*. The mode of using them is simply to boil them in water, when they form a substance similar to *Salep*, or boiled *Arrow-root*. Owing to their highly nutritive quality, these roots are admirably calculated for carrying on long journeys; two or three ounces per day being sufficient for a man, even while undergoing great fatigue.

In June 1826, Mr. Douglas gathrered flowering specimens, but lost them from his boat while descending a rapid. In March 1827, those were secured which revived after having been pressed in the Herbarium, and were planted in the Horticultural Society's Garden, as above mentioned.

TAB. LXX. *Fig.* 1, Plant of *Lewisia rediviva*, β:—*nat. size*. *Fig.* 2, Unopened flower. *Fig.* 3, The same, all the calyx-segments being removed, and the petals, except the inner one. *Fig.* 4, Front view of a stamen. *Fig.* 5, Back view of do. *Fig.* 6, Pollen. *Fig.* 7, Pistil. *Fig.* 8,

Pistil with the germen cut open to show the situation of the young seeds. *Fig.* 9, Portion of a leaf, the central part filled with a thread-shaped tough bundle of fibres or vessels:—more or less *magnified.*

[TAB. LXXI.]

JABOROSA CAULESCENS.

PENTANDRIA MONOGYNIA. Nat. Ord. SOLANEÆ.

GEN. CHAR. *Cal.* 5-fidus. *Cor.* campanulata seu tubulosa. *Filamenta* brevissima, versus apicem tubi inserta. *Bacca* bi- (tri- *Commerson*) -locularis.

1. Jaborosa *caulescens,* (*Gill. et Hook.*); caulibus pluribus decumbentibus, foliis lyrato-pinnatifidis spinuloso-dentatis petiolatis, bracteis subulatis verticillatis, corollis campanulatis intus hirsutis. (TAB. LXXI.)

HAB. In convallibus Andium versus Mendozam. Alt. 6400 ad 10,000 ped. *Gillies.*

Radix longe descendens, subfusiformis, hic illic fibrosa. *Caules* plurimi, prostrati, teretes, vix ramosi, glaberrimi. *Folia* longe petiolata, oblonga, lyrato-pinnatifida, nervosa, spinuloso-dentata, glaberrima; *radicalia* caulinis similia, sed plerumque majora. *Pedunculi* axillares, solitarii vel bini, uniflori, duas tres uncias longi, erecti, demum fructiferi deflexi, ad basin bracteati, bracteis subulatis, sub-verticillatis, patentibus. *Calyx* profunde quinquefidus, inferne pubescens, laciniis lanceolatis erectis appressis. *Corolla* anguste campanulata, tubo mediocri, extus glabra, intus hirsuta, limbo patente, segmentis acutis. *Stamina* fauce inserta. *Filamenta* brevissima. *Antheræ* oblongæ, basi affixæ. *Germen* subrotundum. *Stylus* brevis. *Stigma* oblongo-capitatum, apice transversim sulcatum. *Capsula* globosa, bilocularis. *Receptacula* dissepimento longitudinaliter affixa. *Semina* numerosa, nigra.

The genus *Jaborosa* was established by Jussieu, and derived from the Arabic word *Jaborose*, which was applied to the *Mandragora* or *Mandrake*, a plant of the same natural family; and two species have been described, *J. integrifolia* and *J. runcinata*, both of them natives of the plains on the eastern side of South America, near the mouth of the river La Plata. The present species, widely differing from these in character, inhabits the Andes on the side next Mendoza, and was met with particularly at "Los Hornillos," "alto de las pomas," and by the banks of the river "Tanyan."

Tab. LXXI. *Fig.* 1, Flower. *Fig.* 2, Stamen. *Fig.* 3, Pistil. *Fig.* 4, Capsule. *Fig.* 5, Section of do.:—all but *fig.* 4 more or less *magnified.*

Dr. Gillies has been equally fortunate in finding the two other species of the genus, which I shall thus characterise.

2. Jaborosa *integrifolia;* acaulis, foliis petiolatis ovalibus subintegerrimis, corolla longe tubulosa limbi laciniis valde acuminatis.

Jaborosa integrifolia. *Lam. Encycl. v.* 3. *p.* 189. *Illustr. t.* 114. *Roemer et Schultes, Syst. Veget. v.* 4. *p.* 690.

Hab. Ad vias, locis humidis prope Buenos Ayres. *Gillies.*

3. Jaborosa *runcinata;* plerumque acaulis, foliis petiolatis oblongo-obovatis sinuato-pinnatifidis, corolla campanulata limbi laciniis acutis.

Jaborosa runcinata. *Lam. Encycl. v.* 3. *p.* 189. *Roem. et. Schultes, v.* 4. *p.* 690. *Link et Otto, Ic. Pl. Select. p.* 103. *t.* 48.

Hab. In planitiebus "Pampas" dictis, prope Buenos Ayres. *Gillies.*

In Dr. Gillies's specimen there is no stem whatever, but the leaves and peduncles spring at once from the root, as described by Lamarck. Link and Otto's figure, on the other hand, represents the plant with a stem 4–5 inches long, from which both the flowers and leaves have their origin.

[TAB. LXXII. LXXIII. LXXIV.]

ON A NEW GENUS OF PLANTS OF THE NAT. ORD. CRUCIFERÆ,

From the Andes of Chili and Mendoza.

In the year 1827, my valued friend and correspondent Mr. Cruickshanks sent me from Chili a *Cruciferous* plant, of a very peculiar aspect, which I have now called *Hexaptera cuneata;* but which having no fruit, I could not then venture to publish, though its decidedly 6-winged germen seemed to separate it from every other genus of its tribe. About the same time Dr. Gillies sent me another plant, also without fruit, which I considered, from the structure of its germen, to belong to the same genus. That gentleman's return to Europe has put me in possession of perfectly fructified specimens of this latter individual, and has enabled me to figure and describe it as the type of a new genus of which he has been so fortunate as to find a third species. In all the three, the fruit or germen is furnished with six longitudinal broad wings, from which circumstance I have derived the generic name. In our species, indeed, there are not unfrequently from 1–4 intermediate lesser wings or crest-like appendages. The place of the genus is amongst the *Lepidineæ, seu Notorhizæ angustiseptæ* of De Cand., which that learned author thus characterises: " *Silicula* septo angustissimo, valvis carinatis aut valde concavis. *Semina* in loculis solitaria aut pauca, ovata, immarginata. *Cotyledones* planæ, incumbentes, septo parallellæ;" and it may rank near to *Æthionema,* from which it differs in its valves having three distinct wings, instead of one dorsal one, and in these valves being pendulous from the style, as in *Cremolobus.*

With this latter genus I am unacquainted, save by the figures and descriptions of De Candolle; but that which follows it, in the *Systema* and *Prodromus* of that author, *Menonvillea,* I find to have *incumbent cotyledons,* contrary to the figure in *De Lessert's Ic. t. 56. f.* 11, 12. Hence it must

be removed from the *Thlaspideæ* to the *Lepidineæ*, and it will come very near *Hexaptera*, differing in the absence of dorsal wings to the valves of the capsule, and in its linear petals.

HEXAPTERA. *Nov. Gen.*

Calycis foliola erecta, basi subæqualia. *Petala* obovata, unguiculata, integra. *Stam.* 6, omnia libera, vel 4 longiora per paria ultra medium unita. *Silicula* breviter stipitata, stylo stigmateque incrassato læviter sulcato terminata, bilocularis, bivalvis, valvis ad suturas insigniter contractis, scutatis, e stylo demum pendulis, dorso lateribusque late alatis, monospermis. *Septum* angustissimum, seu obsoletum. *Semen* obovatum, immarginatum. *Cotyledones* incumbentes.—Flores *albi.*

* *Stamina majora per paria ultra medium connexa.*

1. Hexaptera *pinnatifida*, (*Gill. et Hook.*); foliis pinnatifidis, caulinis paucis. (Tab. LXXII.)

Hab. Apud "Quebrada de Rios" in Andibus Chilensibus: prope "Ladera de las Vacas," in valle "Hermosa," et prope ripas fluminis "Tonyan," in valle Tennyanensi Andium versus Mendozam, alt. 10,000 ped. *Gillies.*

Radix descendens, subfusiformis, ut videtur, annua. *Caulis* solitarius, erectus, superne ramosus, teres, pubescenti-pilosus, parce foliosus. *Folia* præcipue radicalia, oblonga vel ovalia, profunde pinnatifida, subglabra vel pilosa, nunc etiam hispida, laciniis ovatis lanceolatisve, acutis vel obtusis, integris vel sinuatis, non raro pinnatifido-lobatis, inferne in petiolum longum attenuata: *caulina* sensim minora. *Flores* corymbosi, demum racemosi, parvi. *Calyx* tetraphyllus, foliolis ovatis, concavis, dorso (pedicellisque) hispidis, erectis, basi æqualibus. *Petala* calyce duplo longiora, obovata, subunguiculata. *Stamina* 6, 4 longiora filamentis per paria ultra medium connexis: *Antheræ* oblongæ. *Pistillum*: *Germen* breviter stipitatum, hexapterum: *Stylus* germinis longitudine: *Stigma* crassum, vertice sulcatum. *Fructus*: *Silicula*, circumscrip-

tione elliptico-subrotunda, e valvis duabus discos efformantibus, parallelis, ad suturam valde contractis, marginibus utrinque dorsoque insigniter membranaceo-alatis: nunc intra alam marginalem et dorsalem iterum ala vel crista parva instructis:—demum a basi dehiscentibus et ex apice styli persistentis pendulis. *Dissepimentum* angustissimum, fere nullum. *Receptaculum* marginale in axin filiformem contractum. *Semen* solitarium quoque loculo, obovatum, pendulum, immarginatum, fuscum. *Cotyledones* incumbentes.

Fig. 1, Flower. *Fig.* 2, Stamens and pistil. *Fig.* 3, Longer united pair of stamens. *Fig.* 4, Pistil. *Fig.* 5, Capsule. *Fig.* 6, Section of do. *Fig.* 7, Capsule with the valves or cells separating. *Fig.* 8, Capsule, one valve being removed, the other suspended from the style. *Fig.* 9, Seed. *Fig.* 10, Embryo:—all more or less *magnified.*

In this genus, the general appearance of the fruit, when come to maturity and separating, is, at first sight, more like that of an *Umbelliferous* than a *Cruciform* plant. Each valve is so contracted at its edges, as to form in itself a distinct *cell* or *capsule:* the only opening is that minute one, by means of which the seed is connected with the placenta. It falls away, therefore, with the cell or valve, which is indehiscent.

* * *Stamina omnia libera.*

2. Hexaptera *spathulata, (Gill. et Hook.);* suffruticosa, caulibus ramosis foliosis, foliis spathulatis pilosis. (Tab. LXXIII.)

Hab. Locis elevatis Andium, intra Chile et Mendozam. *Gillies.*

Planta parva, radice perenni. *Caules,* basi præcipue, suffruticosi valde ramosi; *rami* foliosi. *Folia* spathulata, integerrima, pilis appressis utrinque tecta, inferne ciliata. *Calyx* fructusque purpureo tincti.

In this species, the inner face of the cells or valves are not so closely applied as in the preceding, and the marginal

wings are not parallel; but the general structure of its fruit is precisely the same.

Tab. LXXIII. *Fig.* 1, Flower. *Fig.* 2, Stamens. *Fig.* 3, Pistil. *Fig.* 4, Capsule. *Fig.* 5, Section of do. *Fig.* 6, Leaf:—all more or less *magnified.*

3. Hexaptera *cuneata,* (*Gill. et Hook.*); suffruticosa, caulibus ramosis foliosis, foliis cuneatis appressi-hirsutis tridentatis. (Tab. LXXIV.)

Hab. Inter "Cortaderas et Rio de las Vacas," Andium versus Mendozam, legit amicissimus *Cruickshanks.* In convalle fluminis Mendoza, prope Ladera de Jaule. Alt. 7000 ped. *Gillies.*

Much larger than the last in all its parts, with the leaves truncated at the extremity, and cut into 3 or rarely 4 teeth. Neither Dr. Gillies nor Mr. Cruickshanks have been so fortunate as to gather the fruit of this species.

Tab. LXXIV. *Fig.* 1, Flower. *Fig.* 2, Pistil:—*magnified.*

[TAB. LXXV.]

GYMNOSTOMUM AMBLYOPHYLLUM.

Gymnostomum *amblyophyllum,* (*Gill. et Hook.*); caule innovationibus ramoso, foliis ovatis patulis obtusissimis integerrimis minute reticulatis, nervo valido paulo ante apicem evanido, seta elongata, capsula ovato-oblonga, operculi rostro elongato. (Tab. LXXV.)

Hab. Ad ripas circa Mendozam, Americæ Meridionalis. *Gillies.*

Planta cæspitosa. *Caules* breves, erecti, innovationibus ramosi. *Folia* patentia vel erecto-patentia, ovata, pallide viridia, omnino integerrima, concava, obtusissima, *caulina* basi dilatata margine recurva, *ramorum* magis exacte ovata, margine minus recurva, minute reticulata, nervosa,

nervo paulo infra apicem evanescente, valido. *Seta* in caule terminalis, vix semi-unciam longa, gracilis, flavo-rubicunda. *Capsula* ovato-oblonga, supra medium leniter contracta, rufo-fusca. *Operculum* conico-acuminatum, in rostro, capsula subæque longo, terminatum. *Calyptra* dimidiata, pallide flavo-fusca.

I am not aware of any species of *Gymnostomum* that approaches this in character; nor do I know that it has been found by any Botanist except Dr. Gillies, in the place above mentioned.

Tab. LXXV. *Fig.* 1, Tuft:—*nat. size.* *Fig.* 2, Single Plant. *Fig.* 3, Stem-leaf. *Fig.* 4, Leaf of an innovation. *Fig.* 5, Portion of a leaf to show the reticulation. *Fig.* 6, Capsule. *Fig.* 7, Operculum. *Fig.* 8, Calyptra:—all but *fig.* 1 more or less *magnified.*

NEW BRITISH FLORA, BY DR. HOOKER.

It has often been a matter of surprise to us, that notwithstanding the very numerous *Floras* of *Great Britain* which have appeared, not one has been published under such a form as to comprehend, in the smallest space, all that is essential (excluding as much as possible all superfluous matter) for determining the classes and orders, the genera and species of our native plants.

Those which are most valuable, and too much cannot be said in their praise, are unquestionably the *English Flora* of Sir J. E. Smith, and the *Compendium Floræ Britannicæ* of the same learned author. But without any disparagement to their merits, it may be stated, respecting the former, that its bulk forbids the study of it elsewhere than at home; while the latter, expressly designed for use in the field, is too circumscribed in the characters of its species, (rarely extending to more than two or three lines,) to afford essential assistance, except to those already well versed in the science.

An attempt to steer a middle course between these two extremes—that is, to give, besides specific characters of every species, such descriptive matter and diagnosis as may be requisite to its further elucidation—was made by Dr. Hooker in his *Flora of Scotland;* and the progress of his own Students in the University of Glasgow, who have been in the daily habit of using it during the session, together with the rapid sale of a very

large impression, demonstrated that he was not deceived in his expectation of its utility. Hence, he has been led to extend the same, or a very similar plan, to the *Flora* of the whole *British Empire.* This work is now in a considerable state of forwardness. The author's own experience cannot but have suggested many useful alterations and amendments on the method pursued in the *Flora Scotica.* Thus, for example, by excluding all needless synonymy, and arranging the subject-matter in as compact a form as possible, without rendering it obscure to the reader, he is enabled not only to embrace the whole of the British *Phænogamous Plants* and *Ferns,* in one moderately-sized duodecimo volume, but to give some interesting details, relative to the properties and uses of plants. The language adopted is the English, and in the general employment of terms, he has endeavoured to adhere as closely as possible to those of Sir J. E. Smith; for they may well serve as models, both in regard to the accuracy and purity of expression. The derivation of every generic appellation is stated, with the Natural Order to which it belongs; all the names, both generic and specific, are accented; for, in no work, surely, can these modern improvements be so serviceable, as in one mainly intended to aid the progress of beginners; with which view, also, the meaning of the terms applied to the classes and orders, are explained—Dr. Hooker being fully persuaded that every thing tending to simplify the technicalities of science, assists in rendering it attractive, and increasing the number of its votaries.

The arrangement adopted is that of Linnæus; but since a knowledge of the Natural System ought to be the great end and aim of those who have leisure to devote to this subject, and eminently to such as are destined for the practice of Medicine, there will be added, at the conclusion of the work, a short sketch of the Jussieuan Method; under each respective order of which the most important genera will be mentioned, with some notice of their peculiar properties and qualities.

The work will appear very early in the ensuing spring, (1830), and is published by Messrs. Longman & Rees. The *Cryptogamiæ*, exclusive of the *Ferns,* are to form a separate volume, which will constitute the fifth of *Smith's English Flora*, or the second of the *British Flora.*

ALPHABETICAL INDEX TO VOLUME I.

Adenocaulon bicolor, 19, t. xv.
Asteriscium chilense, 332, t. lxvii. (A.)—A. polycephalum, 332, t. lxvii. (B.)
Astelia alpina, 5, t. iii.
Atropa rhomboidea, 135, t. xxxvii.

Bolax Gilliesii, 325, t. lxiii.
Botany of Countries visited by the Russian Voyage of Discovery, under command of Kotzebue, by Chamisso, 305.
Botanical Society of Germany, 78.
Bowlesia, two species, 324.
Brachymenium pulchrum, 136, t. xxxviii.
British Flora announced, 353.
Bryum giganteum, 37, t. xx.—B. Gilliesii, 3, t. ii.—B. Menziesii, 36, t. xix.
Byttneria heterophylla, 291, t. lxi.

Cardamine angulata, 344, t. lxix.
Castanospermum australe, (*in note,*) 241, t. li. lii.
Castela Nicholsoni, 271, t. lvi.
Citrus, remarks on the species cultivated in Jamaica, by Dr. Macfadyen, 295.
Colletia, account of its species and allied genera, 150, t. xliii.-xlv.
Colliguaja (of Molina) the genus and species, 138, t. xxxix. xl.

Dicranum phascoides, 39, t. xxi.
Dipyrena glaberrima, (*under the name of Wilsonia,*) 173, t. xlix.
Discaria americana, 156, t. xliv. (D.)—D. australis, (*in note,*) 157, t. xlv. (A.)
Draba alyssoides, 126, t. xxxii.
Drummond, (Mr. Thomas,) his *Musci Americani* announced, 93—his sketch of a Journey to the Rocky Mountains, 178.

Eryngium, four species, 334.

Flora of the British Possessions in North America announced, 92.
Fraser, his Botany &c. of Swan River, Cape Naturaliste, &c. 221—his Two Months' Residence near Brisbane and Logan Rivers, New Holland, with account of the most interesting Plants, 237, t. li.-liv.

Grimmia crispata, 133, t. xxxvi.
Guildingia psidioides, 122, t. xxx.
Gymnostomum amblyophyllum, 352, t. lxxv.—G. Wilsoni, 143, xli.
Gyrostemon attenuatum, (*in note,*) 243, t. liii.

Habenaria cordata, 270, t. lv.
Hexaptera cuneata, 352, t. lxxiv.—H. pinnatifida, 350, t. lxxii.—H. spathulata, 351, t. lxxiii.
Hydrocotyle bonariensis, 324.

Jaborosa caulescens, 347, t. lxxi.—J. integrifolia, 348.—J. runcinata, 348.
Jack's Malayan Miscellanies, 273, t. lvii.-lx.

Amomum biflorum, 274.—Calla angustifolia, C. humilis, 288, C. nitida, 289.—Clerodendrum molle, 283.—Curculigo sumatrana, 277.—Flacourtia inermis, 289.—Gmelina villosa, 284.—Loranthus coccineus, 278, t. lviii. L. ferrugineus, 279, t. lix.—Melia excelsa, 281.—Microcos glabra, 282, M. tomentosa, 281, t. lx.—Mimosa jiringa, 282.—Nephelium lappaceum, 279.—Phyteuma begonifolium, 276, t. lvii.—Psychotria malayana, 275.—Rondeletia corymbosa, 276.—Rottlera alba, 290.—Sapindus rubiginosus, 280.—Sphenodesme pentandra, 285.—Sterculia angustifolia, 287, S. coccinea, 286.—Vitex arborea, 285.—Zingiber gracile, 273.

Jungermannia serrulata, β. 13, t. x.

Laretia acaulis, 329, t. lxv.
Ledebour, his Travels and Illustrations of Russian Plants announced, 219.
Lemna gibba, remarks on its structure and germination, by Mr. W. Wilson, 145, t. xlii.
Lewisia, (of Pursh?) observations on, 344, t. lxx.
Lippia, two species, 171.
Lowe, Rev. R. T., his Natural History of Madeira announced, 88.

Macræa, its species, 174 t. l.
Macropodium, two species, 340, t. lxvii. lxviii.
Mahogany Tree, its nature and uses, 21, t. xvi. xvii.
Menyanthes Crista-Galli, 45, t. xxiv.
Monoclea crispata, 117, t. xxvii.
Mulinum, four species, 327, t. lxiv.
Mutisia ilicifolia, 7, t. iv.—M. inflexa, 9, t. vi.—M. linearifolia, 11, t. viii.—M. linifolia, 12, t. ix.—M. runcinata, 8, t. v.—M. subspinosa, 10, t. vii.

Neckera Douglasii, 131, t. xxxv.

Oxleya xanthoxyla, (*in note*,) 246, t. liv.

Parmelia enteromorpha, 127, t. xxxiii.
Parnassia fimbriata, 43, t. xxiii.
Phascum tetragonum, 124, t. xxxi.
Poinciana Gilliesii, 129, t. xxxiv.
Pozoa coriacea, 330, t. lxvi.
Priva lævis, 172.

Retanilla Ephedra, 157.
Riccia natans, 41, t. xxii.
Rice Paper, account of the substance so called, 88.

Saccharum officinarum, Botanical Characters and Culture, by Dr. Macfadyen, 95, t. xxvi.
Schultes, his Botanical Visit to England, 48.
Scouleria aquatica, 33, t. xviii.
Sinapis frutescens, 119, t. xxviii.
Spiridens Reinwardtii, 1, t. i.
Sticta macrophylla, 17, t. xiii.—S. Humboldtii, 18, t. xiv.
Sugar-Cane, its Botanical Characters and Culture, by Dr. Macfadyen of Jamaica, 95, t. xxvi.
Swietenia Mahagoni, 21, t. xvi. xvii.

Trevoa quinquenervia, 158, t. xlv. (B.)—T. trinervia, 159.

Verbena, several species of, and allied genera, of South America, 159, t. xlvi.-xlix.
Vincentia triflora, a new genus from Mauritius, 293, t. lxii.
Vohiria aphylla, 46, t. xxv. (A.)—V. tenella, 47, t. xxv. (B.)

Umbelliferous plants, found by Dr. Gillies in South America, 323, t. lxiii.-lxvii.
Usnea fasciata, 14, t. xi.—U. sphacelata, 15, t. xii.

Weissia reticulata, 121, t. xxix.
Wilson, (William, Esq.) Localities of rare Scottish Plants, 81.—observations on plants in Sir J. E. Smith's English Flora, 336.
Wilsonia,* a new genus, 172, t. xlix.

* Now called *Dipyrena*; the name *Wilsonia* being preoccupied.

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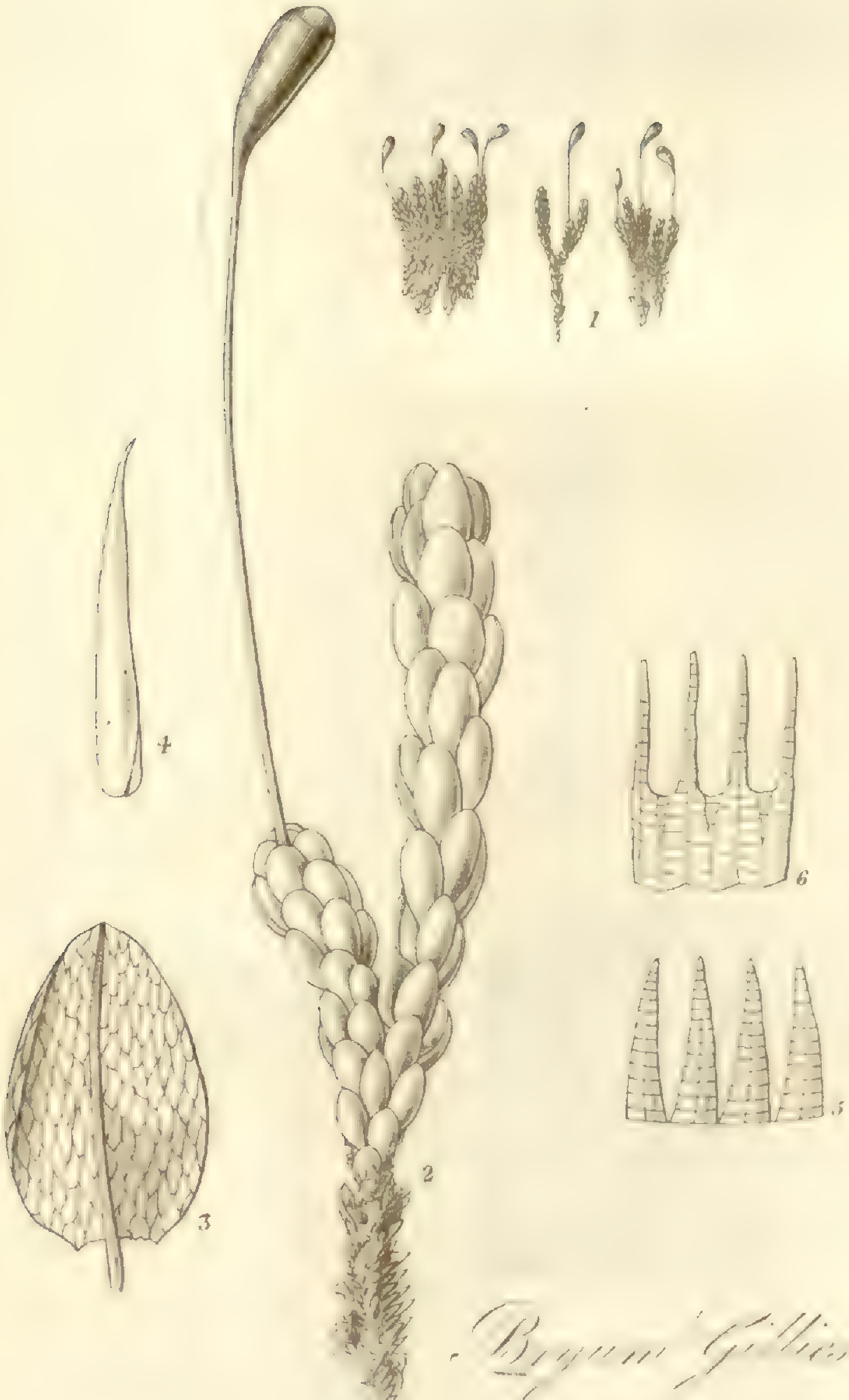
Spiridens Reinwardtii

II



Bryum Gilliesii

III

Astelia alpina

Swan. s.

Mutisia ilicifolia

V

Mutisia runcinata.

W J H

Swan Sc.

Mutisia inflexa.

Mutisia subspinosa

W.J.H.

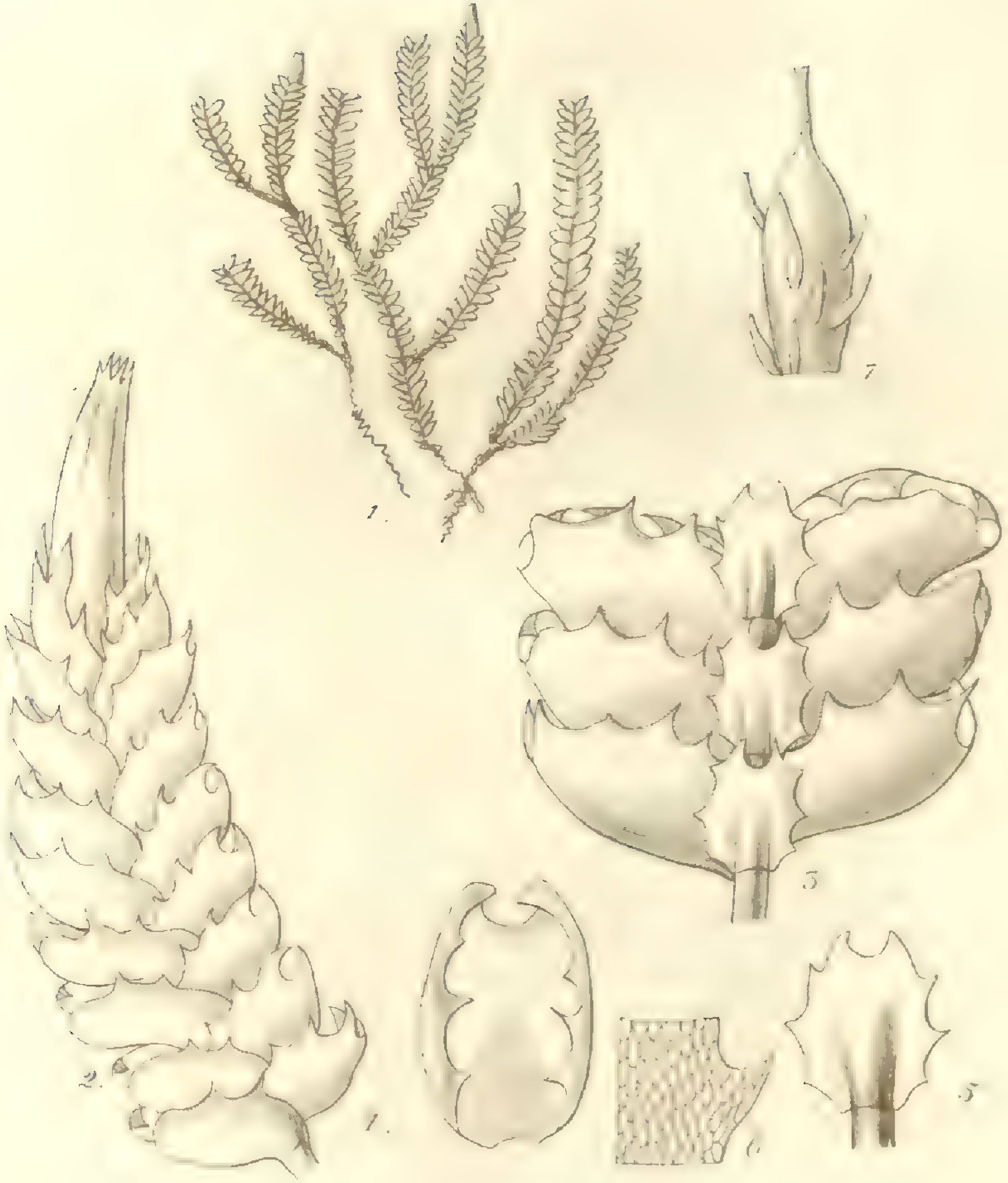
VIII

Mutisia linearifolia

Swan Sc

IX

Aulaxia linifolia.



Jungermannia serrulata!. β.

W. J. H. Swan Sc.

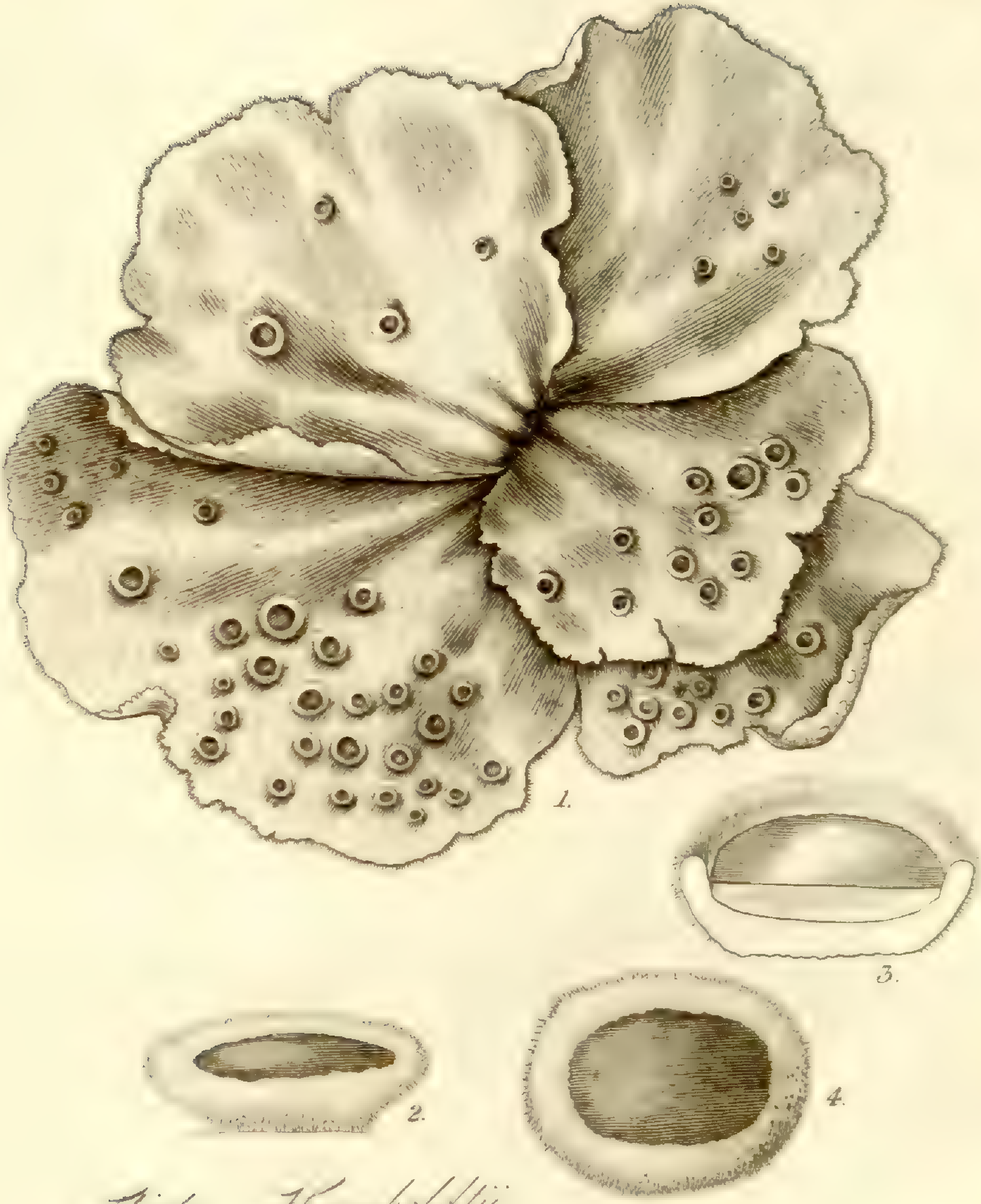
Usnea fasciata.

W. J. H.

Swan Sc.

Vanca sphaerulata

Sticta macrophylla



Sticta Humboldtii

Swan

XV

Adenocaulon bicolor

W.J.H. del.

Swietenia Mahogani. L.

Rev.[d] L. Guilding del.[t]

Swietenia Mahogani. B.

Revd L. Guilding del.

Swan sc.

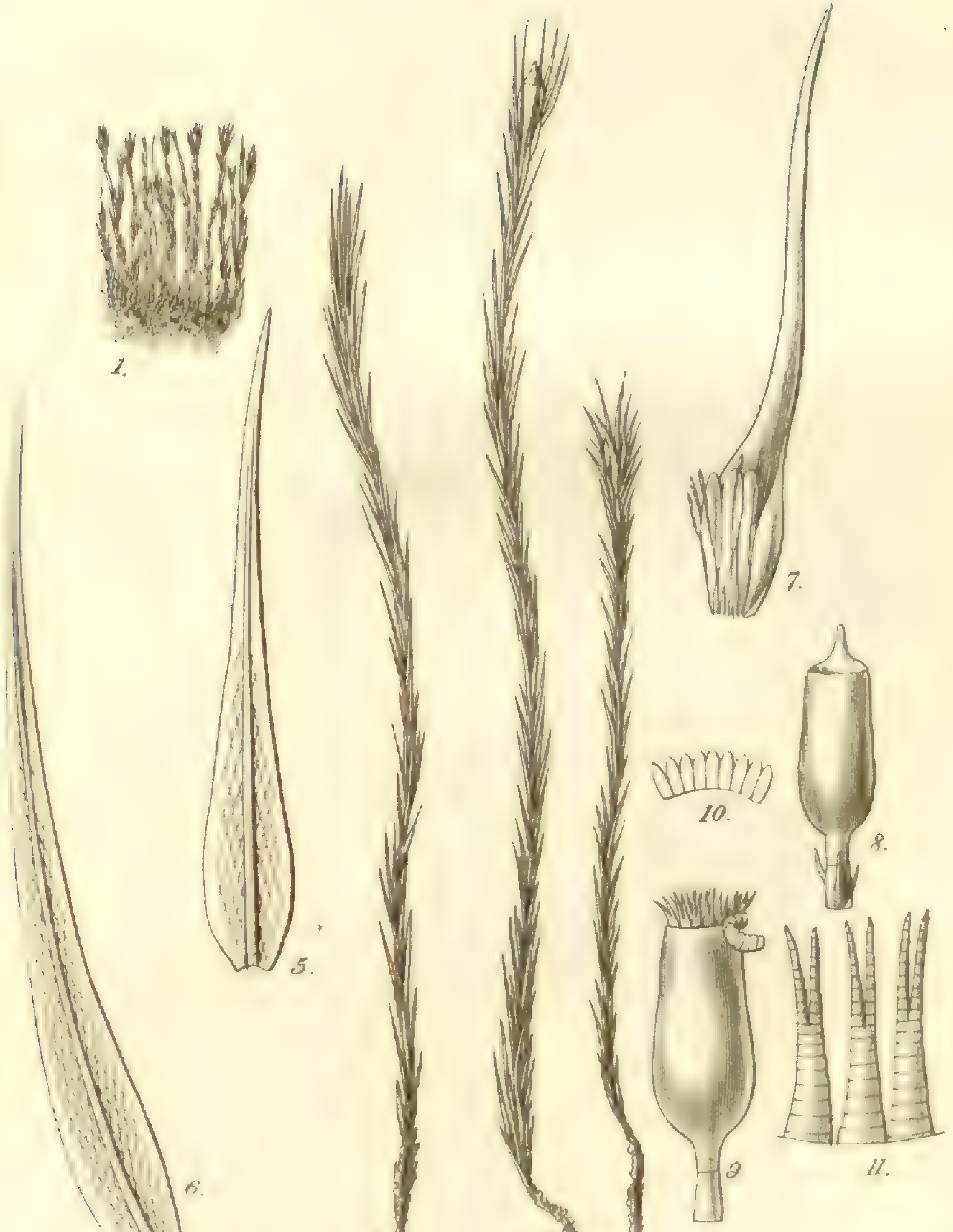
Scouleria aquatica

Swan Sc.

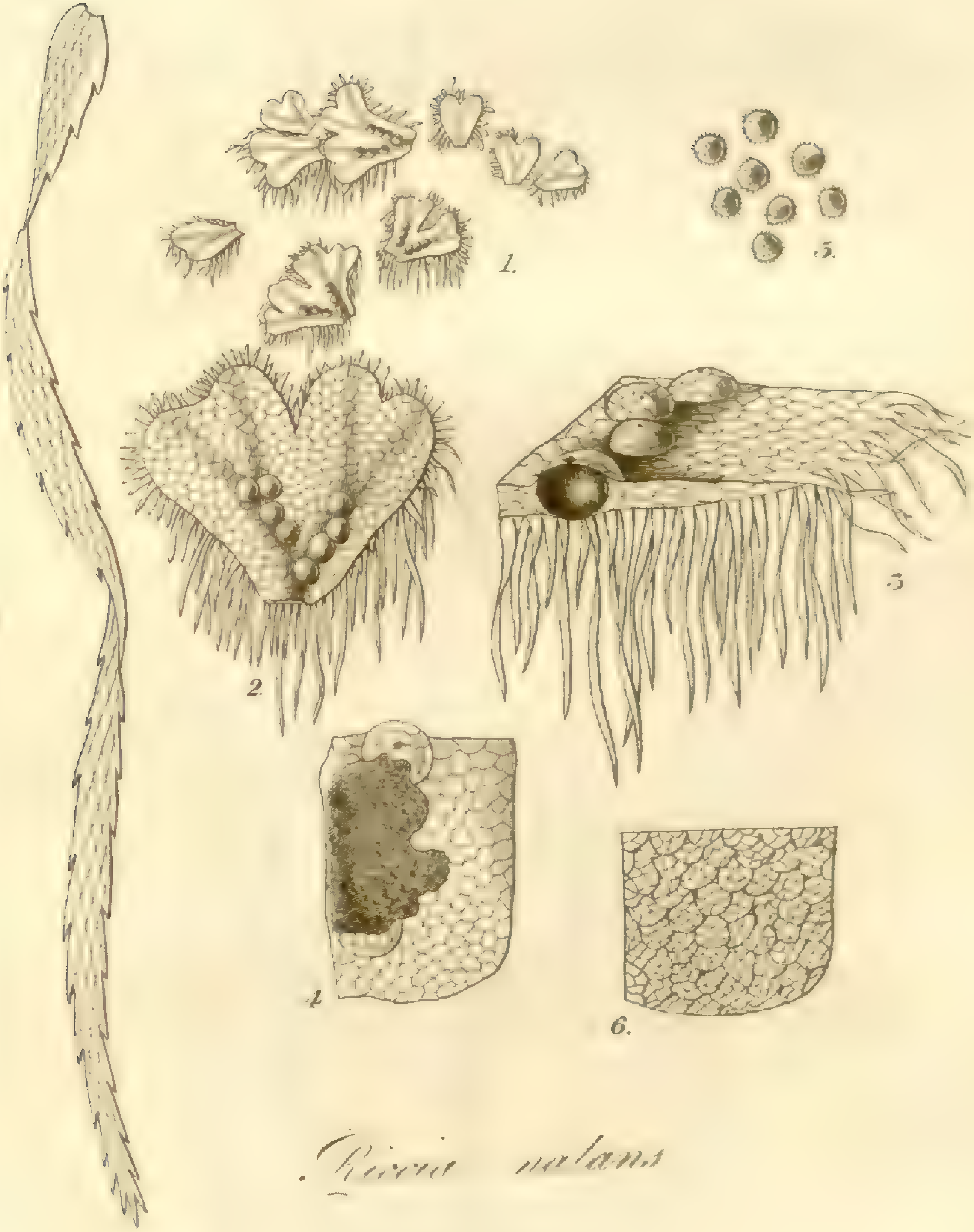
Bryum Menziesii

W.J.H. delt. Swan Sc.

Bryum giganteum



Dicranum phascoides



Riccia natans

W.J.H.

Parnassia fimbriata

A. M. del.

A. H. del

A
B
1
2
3
4
V. tenera.
Voyria aphylla.

Saccharum officinarum. *Sugar Cane.*

Swan Sc.

Monoclea crispata

XXVIII.

Sinapis frutescens

Weissia reticulata

W. J. H. del.

XXX.

Gullingia psidioides

[illegible] del.

Swan sc.

XXXI.

W. J. H. del.

Phascum tetragonum.

Swan Sc.

XXXII.

Draba alyssoides

del.

Parmelia enteromorpha

W. J. H. del.

XXXIV.

Poinciana Gilliesii

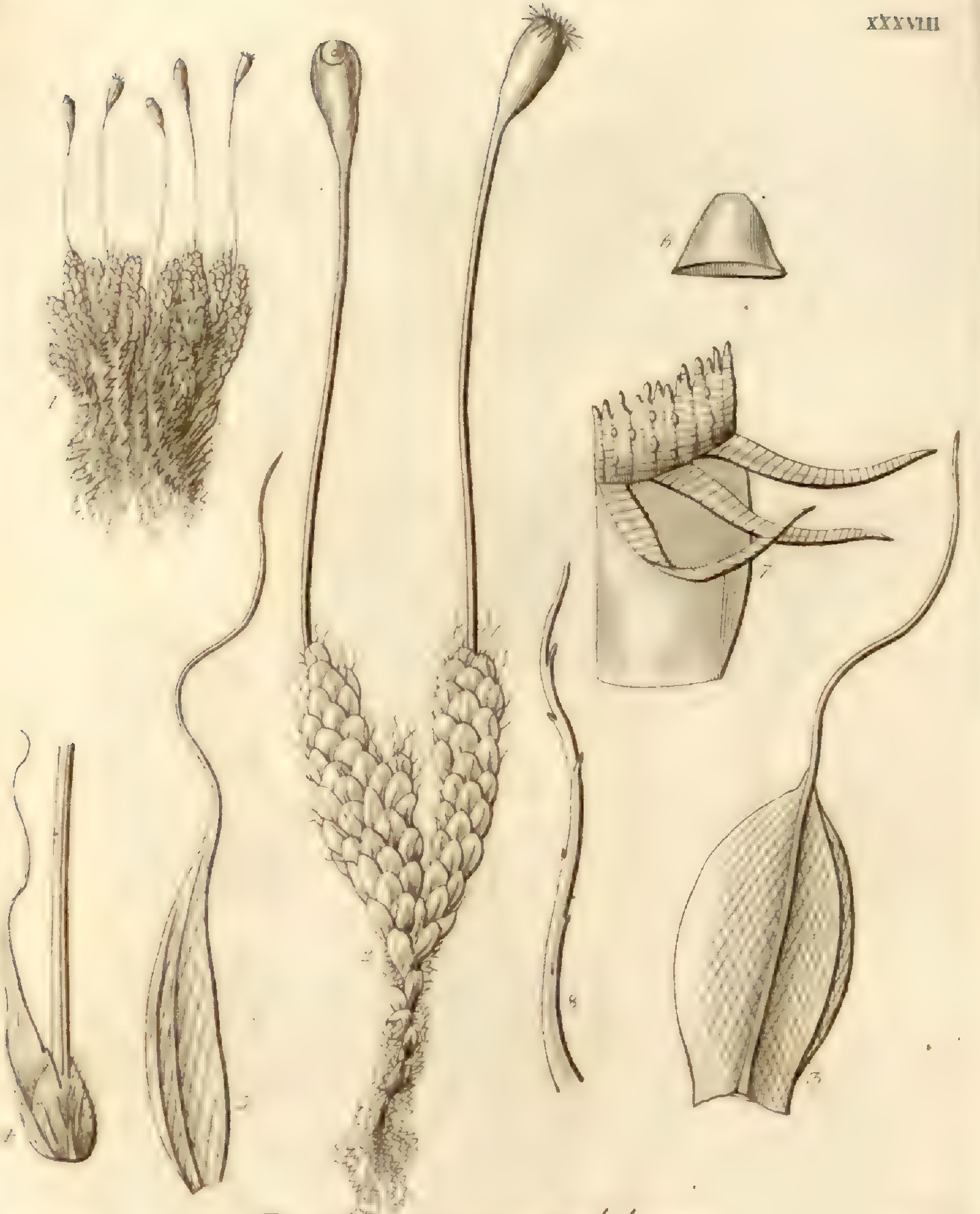
Neckera Douglasii

XXXVI

W. J. H. del.

Grimmia crispata

[illegible] rhomboidea.



W. J. H. del.

Brachymenium pulchrum:

Swan

W. J. H. del.

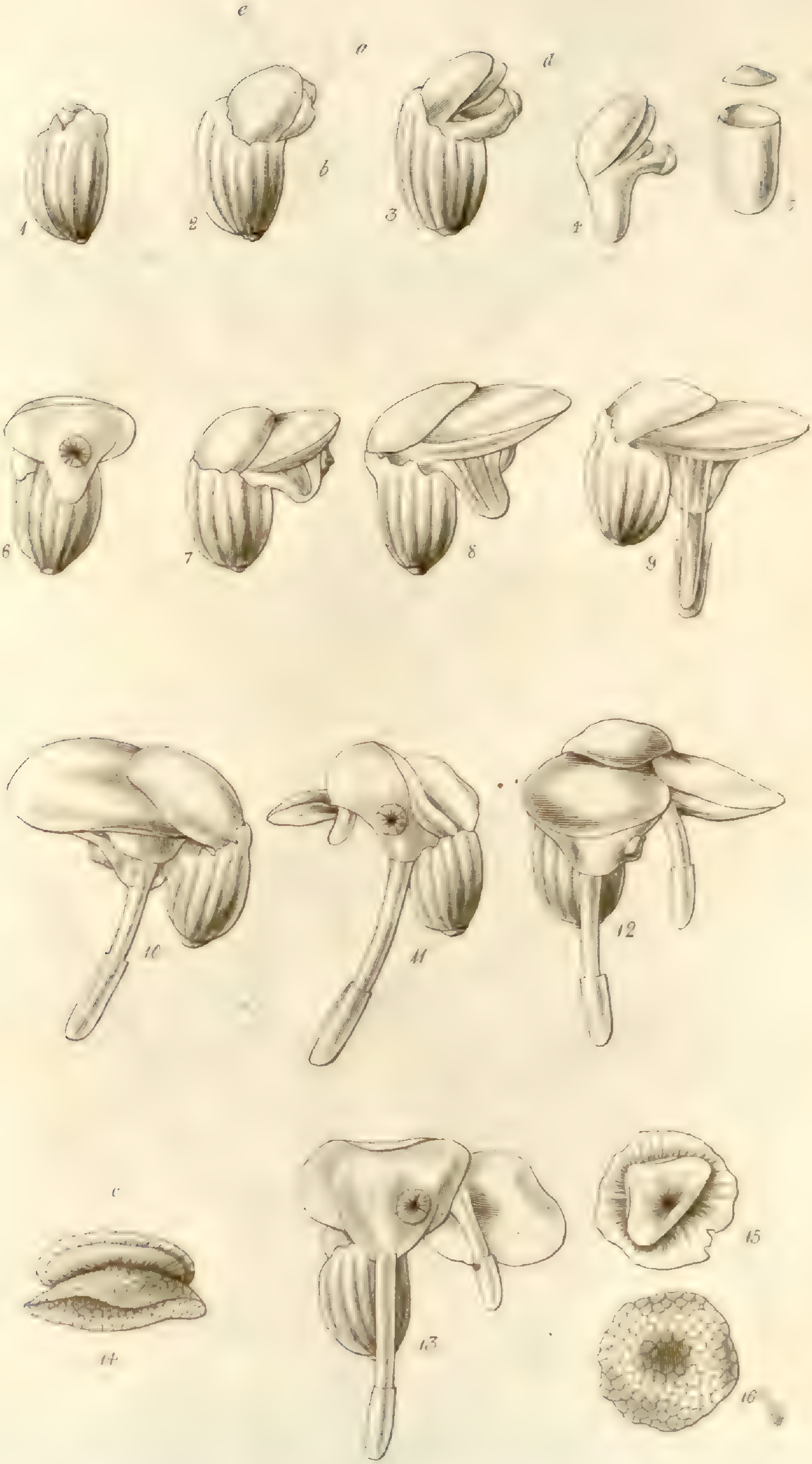
Colliguaja integerrima.

XI.

Colliguaja odorifera.

Gymnostomum Wilsoni.

W. J. H. delt Swan Sc.

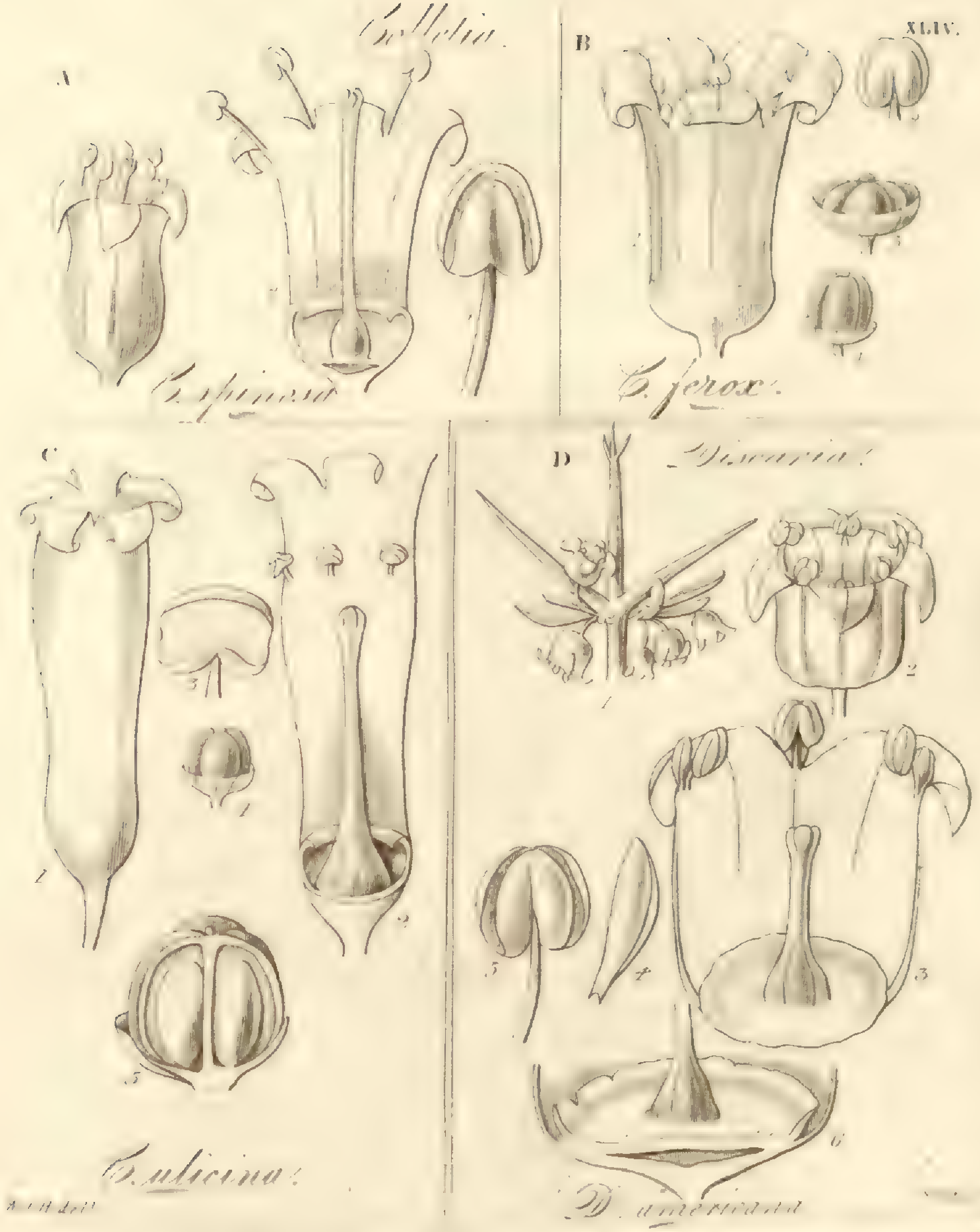


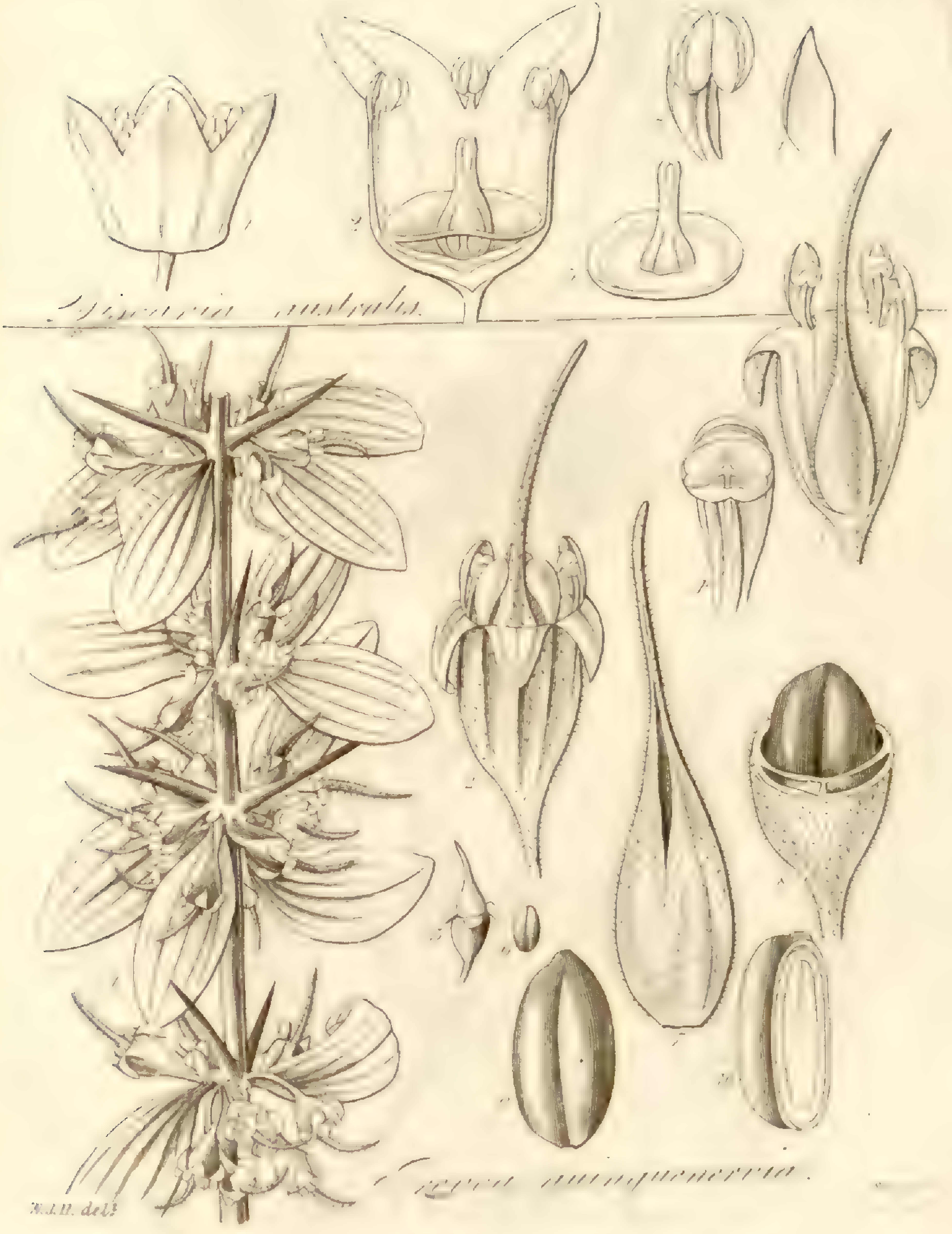
Lemna gibba; Seeds in germination.

W. Wilson del.

Swan

Colletia cruciata.


Colletia.
XLIV.
A
B
C. spinosa
C. ferox
C
D
Discaria
C. ulicina
D. americana


quinquenervia
M.J.H. del.

Verbena aphylla

Verbena scoparia.

W.J.H. del.[t]

Verbena erinacea.

XLIX

Wilsonia glaberrima.

J. T. H. del.

Macraea rosea.

Swan sc.

Castanosper-
mum australe.

W.J.H. del.

Swan

Castanospermum australe.

W. H. del.

Swan Sc.

W.J.H. del.t *Gyrostemon attenuatum* Swan Sc.

Oxleya xanthoxyla

W. J. H. del.t

Castela Nicholsoni.

LVI

S. J. H. del

Habenaria cordata

Phyteuma (Pentaphragma Wall.) begonifolium

W.J.H. del.

Swan Sc.

Loranthus coccineus

Swan Sc.

Loranthus ferrugineus

W. J. H. del.

Swan Sc.

Microcos tomentosa

Swan Sc.

LXI

Byttneria heterophylla

Wm Bernard del.t *Vincentia triflora.* Swan Sc.

Bolax Gilliesii

W J H del.t

Swan Sc

LXIV

Mulinum ulicinum

W. H. del.t Swan Sc.

Laretia acaulis

W J H. del.

Swan Sc.

LXVI.

Pozoa coriacea

W. J. H. del.

Swan Sc.

LXVII
Asteriscium chilense
B
Asteriscium polycephalum

Macropodium nivale

Macropodium laciniatum

Swan Sc

Cardamine angulata

W J E del t

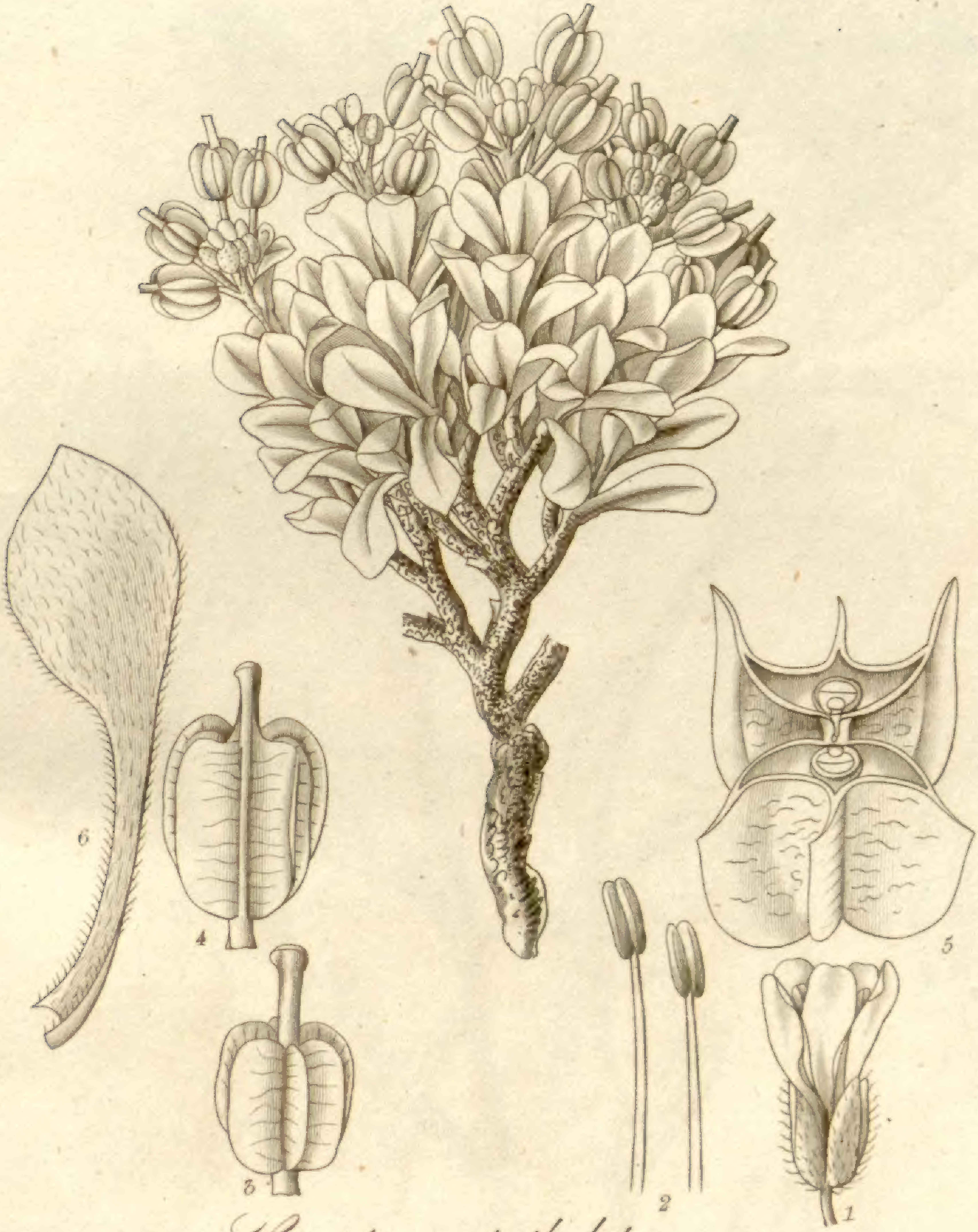
Lewisia rediviva 3.

Swan Sc.

W. J. H. del.t *Jaborosa caulescens.* Swan Sc.

Hexaptera pinnatifida

W. J. H. del.   Swan Sc.



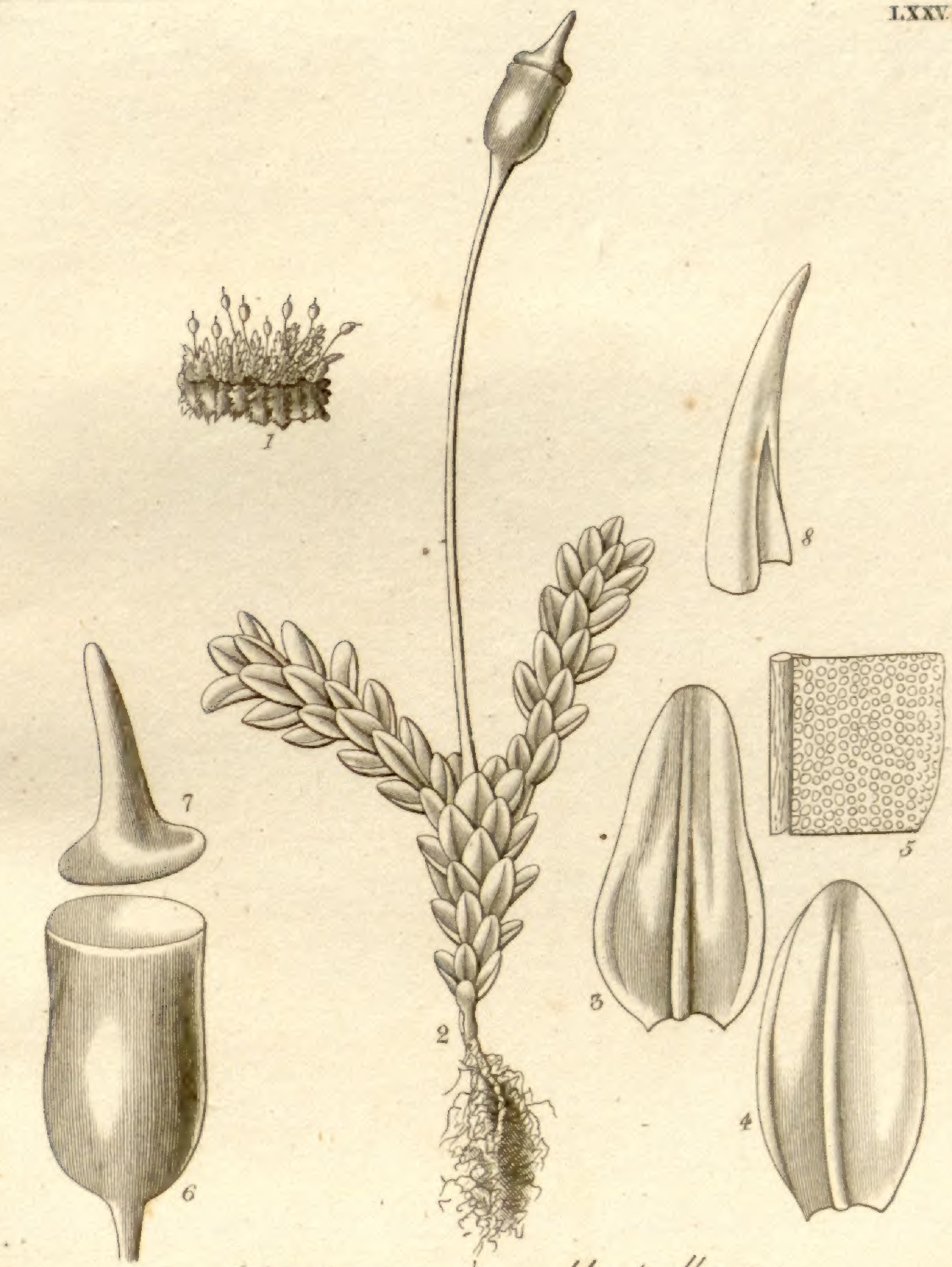
Hexaptera spathulata

W.J.H. delt. Swan Sc.

Hexaptera cuneifolia

W.J.H. del.

Swan Sc.



Gymnostomum amblyopyllum

W. J. H. del.

Swan Sc.